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GAS JOURNAL

LIGHT ✦ HEAT ✦ POWER ✦ BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

VOL. CLV. No. 3037.] LONDON, JULY 27, 1921. [73RD YEAR. PRICE 1s.

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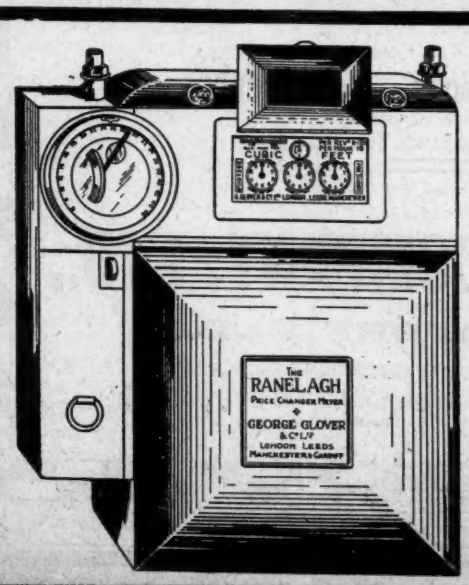

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EDITORIAL NOTES.

The "Make Haste Slowly" Policy.

GENERALLY speaking, the men of the gas industry are under the impression that, all things considered, gas undertakings were not dealt with fairly during the war. They have been controlled from head to foot; have been expected to be altruistic to the extreme; have been compelled to give much, and take little in return. The statutory restrictions under which business was done required revision during the war. They were revised, but financially in a seriously unjust manner, until the Gas Regulation Act came. No other industry has ever experienced what the gas industry did during the past six years, because no other industry has been under the same statutory limitations, nor was capable of rendering precisely the same services to the nation during the period of the war. Mr. D. Campbell, of Anstruther, in his Presidential Address to the Scottish Junior Association (Eastern District), does not deny any part of this presentment of facts; but if we construe correctly what he does say, it would seem that part of our past and present feelings on the subject of the industry's position has its origin in our peculiar psychological state born of a long period of industrial serenity. In other words, probably we feel more acutely the wrong that has been experienced than would have been the case if our pre-war conditions had been of a more troubled order. Other industries, Mr. Campbell reminds us, had pre-war turbulent times—had their ups and downs; so, we take it, they had become hardened to the trials and tribulations which war-time brought, and which they therefore did not feel so acutely as the gas industry, which, until the period of the war, had journeyed on practically undisturbed. This is admitted; but it does not do anything to assuage our views and feelings as to the gas industry having suffered a gross injustice.

The President looks with satisfaction upon the "slow, "steady progress" of the pre-war days; and he shows great admiration for the policy of "make haste slowly," which does not mean a lack of receptivity and an unbusinesslike inertness. That policy he prefers should be applied to the future. There is caution in what he says. He prefers to be sure of his ground before treading upon it. He is wise. There is no trace of the unprogressive in what he submits. He is with the most progressive; but it is with him a question as to the rate of motion. His preference is for certainty, so that there may be no regrets after the Rubicon has been passed. This is all admirable up to a point. But the case of the tortoise and the hare has no very pertinent application in this regard. There is pressure upon the industry all round for a cheap gaseous heating agent, and the economic conditions, taken alone, are much opposed to any substantial cheapening of it. The industry has to fight competitors at every turn; and the best means of carrying on the contest is to produce by every possible internal economy, and to supply, the number of therms in the form of gas per ton of coal which will raise each undertaking to the best economic level, having regard to coal prices and the conditions of the markets for secondary products. It is good policy in Mr. Campbell's eyes that the chemist, the engineer, the architect, the politician, the accountant, and even medical men should as now be working in unison to advance the interests of the industry. With all the safeguards that this collaboration gives, it is more than probable the old stately progress of the gas industry could be accelerated, and, instead of the time-honoured policy of making haste slowly, advantage will be found by the industry and its customers in an increased momentum. All fundamentals, and they are manifold, of our gas manufacturing and supply conditions have undergone transformation. We have to counter these changes by every possible means, and in every possible direction; and this can only be done by shifting off the old lines and adopting the new. The sooner we get to the new, the sooner shall we make more efficient the public service of the industry.

Gas undertakings have been forcibly held back; but many in the industry do not realize it. They were satisfied with the "slow, steady progress," and with the policy as they thought of "making haste slowly." A definition of "making haste" is not given in the address; but everything that is being proved now, everything that is being done now in the industry, and the changes that are being effected, satisfy us that we have not been making haste fast enough. Conceptions were at fault. Some undertakings clung to gas heavy with hydrocarbons and high in luminosity long after the production of gas giving a good heating efficiency, and of which more could be made per ton of coal handled, had been proved the proper policy. Science has assured us that there was no need for the prolonged continuance of the old policy, that the industry has been uneconomical, and that there is much ground on which there has been waste in the past, and over which long strides can now be made. The primary duty of gas undertakings is to be sellers of heat units, and to see that good service is given by the consuming appliances. But the measure of our pace to-day must not be that of the past. With the increased protection that science has given to us, there is no reason why decision and action, and therefore progress, should not be quickened. The "make-haste "slowly" policy, when defined by the doings of the industry in the times now dead, is old-fashioned, and much out of place in the new order of things. We have to apply present-day values and circumstances to the expressions we use, as well as to our ideas and actions.

Handicaps of the Industry.

OF course, the industry has its handicaps. On the same occasion, Mr. J. W. M'Lusky, the Engineer and General Manager of the Glasgow Corporation Gas Department, referred to these. There are many handicaps; but it is the business of the engineer and manager of every gas undertaking to do his utmost to lighten them. Mr. M'Lusky did not refer to them all; but he pointed to four, which are so big and so strong and adversely effective that they cannot escape notice. These are the inadequacy of the manufacturing plant, the allocation of unsuitable and grossly inferior coal, defective and small service-pipes, and inefficient private gas appliances. Respecting the first handicap, there should now be some easing-off, in view of the reduced values of labour and of materials generally. Moreover, so far as the carbonizing plant is concerned, several undertakings are increasing gas-producing capacity by incorporating plant for the complete gasification of coal, which reduces the capital and labour charges per therm or per 1000 c.ft. In regard to the allocation of unsuitable and grossly inferior coal, Mr. M'Lusky made the simple laconic comment: "We "hope this nightmare has passed into oblivion." It is true that gas undertakings can now purchase coal where they please, and of the most suitable chemical and physical characteristics to meet their particular purpose, save in respect of the ash content. And until the gas industry joins other big consumers to force a reversion to the forking of coal instead of shovelling into the tubs, we are afraid that a goodly percentage of the coal purchased will continue to contain an excess of useless material.

The handicap of defective and small service-pipes is in

some districts very prevalent. But we are not disposed altogether to blame for this the predecessors of the present chief officials of gas undertakings. These predecessors, or the greater number of them, were not, when the service-pipes were installed, at the point of observation in reference to gas-consumption possibilities at which we stand to-day. Those engineers and managers who were in office in immediate pre-war days are very much to blame for not having started seriously, and made good progress before then, to eradicate the worst defect, seeing that for years prior to the war it had become quite obvious that the gas industry was destined to provide a large proportion of our domestic fuel requirements. Then in regard to inefficient private gas appliances. In many districts, the greater number of such appliances are on the hire system; and therefore they have been bought on the recommendation of the gas officials. Where such appliances are privately owned, the fact of their existence shows that the gas education of the householders, and the advice tendered to them by the gas authorities, have not been of the most advanced order.

The most serious difficulty admittedly is that of house piping; and it is the cost of replacement that stands very much in the way of improvement. With Mr. M'Lusky all will agree that in these difficulties we have the strongest possible argument for a proper system of maintenance, and free advice regarding choice of fittings. As he says, progressive companies have been doing such work for many years; but it has evidently been a matter of the greatest difficulty to introduce the system in corporation undertakings, owing largely to the strong opposition of local tradesmen. It is evident from this that the local tradesmen themselves require educating. They must be educated up to the fact that it is as much to their interests as to those of the gas undertaking that the purchasers of gas appliances should subsequently derive such efficiency from their use that they will be satisfied, and so be good advertisers. With a recognition of this, it should be an easy matter for corporation undertakings to set about giving advice as to the characteristics of both fittings and appliances which will best serve the interest of the consumers. Of late, Parliament has been taking a much broader outlook regarding the question of prescribing gas-piping and so forth in new houses; and section 10 of the Gas Regulation Act, sub-sections (*h*) and (*i*), provide that the Board of Trade may "modify or amend the provisions of any Special Act "or other provision relating to the undertaking affected by "the Special Order as may be necessary to provide for the "proper and efficient conduct of the undertaking," and "make such supplemental and consequential provisions as "appear necessary to give full effect to the Order." These sub-sections clearly give the Board of Trade all the power needed to make amendments in legislation so as to enable gas undertakings to be carried on with efficiency. We feel sure, too, that the Board would be even more disposed to legislate for the specification of internal piping in view of the provision in section 1 of the same Act which requires gas undertakings "to alter, adjust, or replace the "burners in consumers' appliances, in such manner as "to secure that the gas can be burned with safety and "efficiency."

One other point in Mr. M'Lusky's address alludes to the sliding-scale system of charging domestic consumers on the basis of consumption, and making variations in price at 10,000 c.ft. stages. The proposal is no doubt excellent where it will apply; but under the sliding-scale system of charge and dividend in the case of companies, we are afraid that a form of discount would have to be given in lieu of varying fixed charges for different consumptions. However, it is well to have reminder of these several handicaps from an engineer in such a responsible position as Mr. M'Lusky occupies.

French Gas Regulation Legislation.

FRANCE is considering the fuel question, with the view to adopting a settled policy. The Chamber of Deputies have had a debate upon the subject, which we report in later columns to-day. As a result of the debate, the first stages have been taken in the progress of a Bill which makes a start on the fuel problem by proposing certain regulations to the gas undertakings of the country. In one respect—that referring to calorific power—no great objection can be urged to what is contemplated; in a second respect, a restriction applying to water gas indicates ill-consideration, and the necessity for better guidance of the politicians by science, supplemented by the long practical experience which other countries have had, and which France has not; and, in the third place, we would, with all deference, suggest that the French Government, in using the power to enforce the recovery by gas undertakings of certain bye-products, should exercise care, and assure themselves that they do not inflict on communities an injury (otherwise than in times of war) by compelling the smaller undertakings to engage in the recovery of an amount of benzole that would, through its very smallness, prove exceedingly costly. Furthermore, conservation of fuel is the primary object of the present movement; and though they profess to have this in view, together with the interests of the gas consumers, it is quite obvious the Chamber of Deputies have altogether ignored the developments in gas manufacture, and the prospects of complete gasification. We repeat (and that strongly) the advice that, before the French Government proceed further, it is highly desirable that they should have better guidance from a thorough technical exploration of the whole subject.

Having said this, there are only two points upon which comment will at present be made here. First, in respect of calorific power. The Bill, as it has been amended, contains a novel proposal to which no immediate exception can be reasonably made by gas undertakings, municipal authorities, or gas consumers, having in view the fact that efficiency of gas in use does not appreciably vary with the calorific value per cubic foot or metre. Therefore, so long as the price has relation to the calorific value supplied, the municipal authorities and consumers are amply protected. The novel feature is that maximum and minimum calorific powers have been inserted, above which or below which, if the Bill becomes law, it will be illegal to supply gas. The calorific value is not to exceed 4700 calories per cubic metre (528 B.Th.U. per cubic foot), nor is it to be below 3500 calories per cubic metre (393 B.Th.U. per cubic foot); and the charge, as we have said, is to vary according to the calorific power. The members of the Chamber of Deputies may not all be aware that in this country the new legislation provides for the charge being made at per therm (100,000 B.Th.U.) instead of per 1000 cubic feet; and this is the most perfect safeguard the consumers can have, as it means a positive assurance that they will receive the value for which they pay.

The proposal to limit to 20 p.ct. the proportion of water gas in the mixed gas sent out to consumers is a retrograde one, and is based purely upon the toxic quality of carbon monoxide. It ignores completely the experiences in distributing larger proportions (without statutory hindrance) in this country and in America, as well as the scientific knowledge as to the value of a good percentage of carbon monoxide in gas in view of its radiating power and other virtues, which were recently well brought out in the evidence given in this country before the Carbon Monoxide Committee appointed by the Board of Trade. We would strongly counsel the French Government to have that evidence reported in our columns considered in detail, and then await the issue of the report that the Departmental Committee here will make, to ascertain whether or not the findings ratify any such narrow limitation as 20 p.ct. for water gas. We feel confident that they will not. The extent of the risk exists more in imagination than in actuality, as proved by practice in this country and in America; and having in view the conservation of fuel, and the economies of gas production and service to the consumers, a proposal for any such limitation as 20 p.ct. is the product of misunderstanding, and is nothing short of an absurdity.

There are good points in the Bill, and there are bad ones which are diametrically opposed to its main purpose. As it stands, parts of the Bill are ill-conceived, and the provisions and intentions hang together very loosely, having regard to fuel conservation, and the economic object of increasing the use of labour-saving, smoke-preventing gaseous fuel. The greater the encouragement given to the use of this by the cheapening of production and supply, the greater will be the source of the secondary products which the Government desire.

Coke-Oven Gas During the War.

THE people of Middlesbrough are to be congratulated on their relations with the suppliers of coke-oven gas to the Corporation gas undertaking—Sir B. Samuelson & Co., who, in this country, may be counted as pioneers in the matter of utilizing to the best possible advantage their

surplus secondary product, gas. The great and apparently insurmountable weakness in the supply of coke-oven gas for use by a community is the stoppage, complete or partial, that arises in such service on a coal strike, or when, owing to such strike, or from other trade causes, there is no or little demand for metallurgical coke. Through the supply of coke-oven gas, Middlesbrough has enjoyed a low-priced gas supply when people in other towns have had to pay much higher charges. Now the Middlesbrough consumers have temporarily to pay a higher figure in order to tide-over the difficulties brought about by the strike. They have had to suffer a shortage of supply; but, through an arrangement into which Sir B. Samuelson & Co. have entered, there is to be a partial resumption of supply which, with the resources of the Corporation Gas Department, enables a full gas service to be again given. Inasmuch as it is expected that it will be six weeks or so before full supplies of coal will be available, and blast-furnaces in the district may not be starting again for that time so as to create a demand for coke, it can well be seen that the firm would be losing money in producing coke for which there is no sufficient sale, and in running their plant solely to satisfy gas requirements. Consequently, it has been agreed that a sum shall be paid by Middlesbrough to help compensate for the losses incurred. This will account for the increase in the price of gas by an extra shilling.

In the circumstances, there is no legal obligation on the part of the firm to supply gas at the present time. Nevertheless, under a business pact of this nature, there is a moral obligation to do all possible to assist in relieving the situation. At times such as strikes which interrupt coal supplies, the inhabitants of cities and towns look to the prevision of the administrators of gas undertakings for keeping them supplied with gaseous fuel. The public have a good deal of faith in their ability to do this; and this is a reputation that, within reason, must be preserved. Gas undertakings during the late long strike—through their stores, through their ability to make water gas, and through their enterprise in paying heavily for imported coal to keep the supply of gas going at in many cases a heavy loss—stood between the community and a fuel famine for cooking purposes. There has been little public recognition of this important service, which did more to uphold public content than anything the Government did. But the problem of keeping coke-oven gas supplies going where these are applied to the purposes of the community, was not solved by the recent strike. The method of development at the coke-ovens, it seems to us, would be to sell still more coke-oven gas to towns, and to devise plant for supplying low-grade gas for oven, boiler, and other heating, but which plant could, in the event of the ovens being let-down from any cause, be utilized for complete gasification purposes, and the making of a higher grade gas, to help to supplement the shortage of the coke-oven gas. It would be very interesting to have the strike experiences of the different places taking coke-oven gas supplies, and to learn whether any useful lessons were derived from them.

Effects of Aërating Ammoniacal Liquor in Circulation—Cyanogen Removal.

IT has often been remarked that the recounting of one's failures in experimental or other technical work is valuable. This is true, because on the one hand it may save the time of other experimenters in going over precisely the same ground, and probably meeting with the same fate, and, on the other hand the description of the work that led to the failure may suggest to another worker precisely the point where some addition or some modification may turn failure into success. We have known, and many other workers in the gas industry have known, cases of this kind. The gas industry is indebted to Dr. T. Lewis Bailey, the Chief Inspector under the Alkali Works Regulation Act, for (among much else) the section of his recently issued annual report treating of the oxidation of ammoniacal liquor by air. This work has been taken up again and again over a long series of years. It began as far back as 1898. Mr. Forbes Carpenter, when Chief Inspector, interested himself in the matter; Mr. W. S. Curphey, his successor, did the same. But it is only now that an opportunity has occurred, of which Dr. Bailey has taken advantage, to summarize the work [*ante*, p. 161] which led to negative results, but which could not have been proved without investigation. The disclosures of the tests, however, are not without value, as they may be suggestive to others; and no one would be more delighted than Dr. Bailey if what he relates inspires work which results in success where the Chief Inspectors and their staffs have failed.

The efforts of Mr. Forbes Carpenter some years ago were directed to lessening the work thrown upon oxide purifiers attached to sulphate of ammonia plants by preliminary aëration of the liquor to effect oxidation of the ammonium sulphide to thiosulphate; but he found the rate of oxidation proceeded too slowly, even under favourable conditions, to render it commercially practicable. The fact that Mr. Curphey subsequently devoted much time to the problem indicates that he was hopeful of success. But he again found that no practical process could be devised for speeding-up the process. During his tenure of office, the matter was revived. Cyanogen compounds are not friends of gas-works plant. The special form of corrosion to which they give rise makes elimination of even the small percentage contained in properly purified gas a thing to be much desired. At present, however, this is not practicable; and it has not been made practicable by experiments which were carried out at a gas-works near London, and are described in the report. A simple process for complete elimination would be something that the gas industry would receive with open arms; and had the experiments mentioned in the report been successful, a method would have been available, it is hoped, for compassing the desired end. At the same time, the efficiency of cyanogen removal in gas-works is very variable. There are not many works that employ a washer-scrubber containing special reagents for cyanogen absorption; but, apart from washing with special reagents, there is good absorption by the ammoniacal liquor in the ordinary washer-scrubbers. The oxide purifiers, too, will (given favourable conditions) absorb practically the whole of the cyanogen compounds; and oxide is better than lime for recovering cyanogen in commercial form. Where the escape of cyanogen is high—bearing in mind complete elimination is preferable to even a low escape—it seems to indicate that either the prior removal of ammonia has been inadequately effected, or there has not been proper control of the purifiers in respect of air admission and overheating. Both overheating and the presence of ammonia are antagonistic to the efficiency of the oxide in removing cyanogen.

Returning, however, to the report. Trial was made to ascertain the effect of aëration on ammoniacal liquor circulated in the washer-scrubbers, more particularly to determine whether there would be a reduction of the amount of volatile cyanide in the liquors and indirectly in the crude gas entering the purifiers. It was suggested that relief might be sought for cyanogen troubles in gas-works practice (where liquors were circulated to bring them up to strength) by admitting the air used to effect the concurrent aëration of the oxide in the purifiers at more than one point in such a way as to bring about the oxidation of the ammonium sulphide under controlled conditions, with concurrent formation of thiocyanate, without much exceeding the equivalent of polysulphide. The results of the experiments made at one of the larger gas-works near London afforded no expectation that the volatile cyanide in the crude coal gas could be reduced to the desired figure by simple aëration of the circulated liquor. The tests and the results were described in abstract form in these columns last week. In the tests the gas passed through a Kirkham, Hulett, and Chandler centrifugal washer, and then on to a faggot-packed scrubber (No. 1), and away to a scrubber packed with coke. A limited and controlled supply of air was admitted just prior to the centrifugal washer. The result is worth emphasis. The amount of oxidation in the centrifugal washer was undoubtedly low, considering the temperature of the liquor in circulation (80° Fahr.) and the excess of oxygen present; but there was a satisfactory increase in the figures for ammonia, sulphide, and volatile cyanide. This indicates that, had it been practicable to maintain the liquor at air temperature (60° Fahr.) during the circulation, a liquor of full strength might have been obtained in the one apparatus, and sent direct to the sulphate plant for distillation, instead of being utilized in secondary tower scrubbers, where the added effect was almost negligible. This is an interesting and a suggestive result. No less so is the fact that the effect of liquor circulation in No. 1 tower scrubber was disappointing, but hardly surprising, considering the strength of the feed liquor. In this no discernible oxidation took place, and the absorption of ammonia was exceedingly slow. The result in this case, the report says, could hardly have recouped the

management for the cost of pumping. There is in what is said here as to the efficiencies of the respective scrubbers matter worth very serious consideration. Looking at the results, and bearing in mind the amount of control work that should be done to realize high efficiencies in connection with gas making and the accompanying processes, it is only confirmation of what has been so often advised, to find Dr. Bailey counselling that wherever practicable there should in gas-works be complete chemical as well as engineering supervision. This is a policy that has already been adopted by the larger works; but the administrators of the smaller works have not yet grasped the fact that in many of them there is such scope for savings that these would pay for the chemical supervision, and leave a decent profit in hand.

Burnt Oxide as a Catalyst.

In these days of heavy labour costs, purification expenses have been ascending in common with all other items of outlay in connection with gas production. The emptying of purifier boxes, and their recharging, means greater cost for labour now than in 1913-14. Thus it is that it is more necessary than ever that material of proper physical characteristics should be used in the purifiers so as to realize, by the maintenance of the most suitable reaction temperature and other conditions in the boxes, the highest purification efficiency, which, of course, carries with it the proper treatment of the gas preliminary to the purifiers. The realization of the highest purification efficiency means a reduction in the handling of material. From the annual report of the Chief Inspector under the Alkali Works Regulation Act (Dr. T. Lewis Bailey), we see that experiments have been instituted by Mr. S. E. Linder, B.Sc. (Assistant to the Chief Inspector), with the view to determine the efficiencies of burnt oxide and wood charcoal as catalysts in purification. With the latter substance, the experiments have not proceeded far; and with the former, reliance can only be placed upon the work to the extent that the experiments are purely laboratory ones. But there is satisfaction in learning that they are to be pursued under gas-works conditions, with the view to ascertaining the working conditions that best favour maximum efficiency. In his North of England Gas Association paper last year, Dr. Weyman showed that, under the conditions he then described as favourable, natural oxides (other than bog ores) and burnt oxide give good results; and Dr. Bailey refers to this. Of course, viewing oxide of iron as a catalyst, one would anticipate that the activity of the material would have close relation to its physical properties, and that given right physical conditions, failure would only result from the omission of certain necessary precautions. As is seen from the report, the bulk of the burnt oxide used in the trials is ferric oxide; the total iron content being over 65 p.ct. The experiments showed that the material possesses all the properties of an active catalyst, promoting the combination of sulphuretted hydrogen and oxygen, and itself undergoing no apparent change of condition, either chemical or physical. It is described as an ideal catalyst for oxide purification; but, from the gas maker's point of view, it has one disadvantage—the fresh oxide is markedly more active as a catalyst than the product obtained after continued use. The actual results of the laboratory experiments, with burnt oxide fresh and used, are given in graphic form in the report, and are reproduced by us in this issue of the "Journal." The information will cause many readers to look forward with interest to the results from the working-scale trials.

The Carbon Monoxide Report.

The "Votes" of the House of Commons for Monday announced that the report of the Departmental Committee on Carbon Monoxide had been presented to the Board of Trade. It was ordered that the document should "lie upon the table."

Bank Rate Reduction.

To keep the history of the present times intact as it affects gas companies, it may be mentioned that last week the Bank rate was lowered to 5½ p.ct., which means a reduction of 1½ p.ct. since April 28. There is some regret that, with trade almost at a standstill, and the Government the only substantial borrowers, the Bank of England could not see its way to make a larger reduction, and so restore the confidence which is required to set our finances in order. It is noticed that there are borrowers in the gas industry who have broken away from the stereotyped 7½ p.ct. for redeemable debenture stock, and have invited applications at par with the interest at 7 p.ct.

Gas Appliances as Afterthoughts.

Nearly all domestic gas-consuming appliances—cookers, gas-fires, circulators, and geysers—are "afterthoughts." This is the term used by Mr. D. Campbell in his address to the Scottish Juniors. The fact is nobody's fault. These labour and time-saving conveniences all came after houses were built. The pity of it is, when their utility had been proved, architectural custom stood so long in the way of the adoption of gas appliances as part of the design of new houses. Mr. Campbell hopes that this sort of thing is not going to be perpetuated. It will not be the fault of the British Commercial Gas Association if it is; for they have worked, in connection with the new housing schemes, assiduously in the cause of reform in all the avenues that have been open to them, and have attacked others with a persistence that has been admired, if not always successful. Architectural knowledge as to the advantages of gas appliances displacing coal-consuming ones is not so much in arrear of progress as it was two or three years ago. But has the work been, in all cases, backed-up by local gas effort to the degree that it should have been? We know of big successes in connection with the housing schemes; we know, too, of new houses in which the chimneys to equal number as of old rear their unnecessary heads. We want fewer "afterthoughts" in the future, except in the old houses, than there have been in the past. Provision for the use of the fuel the gas industry supplies, and which people want, should be made as houses are constructed, and at the expense of those who now pay for coal ranges and grates.

Oven Efficiency.

There is part of the address for the consideration of our manufacturers of gas-ovens. Mr. Campbell is of opinion that the height of the oven could advantageously be shortened, that attempts should be made to obtain uniform heat throughout the oven, and to promote better efficiency than is now the case in many old types. He makes suggestions. The bottom part of the oven is useless; and he ventures to predict that the oven of the future will be a cube, which will offer the smallest outside surface for heat losses. He suggests, too, that means should be adopted for making the flames visible; also that a thermostat should be provided, which could be varied through a wide range of temperature. He is further in favour of flue control being brought about by an alteration in the form of the flue rather than by a complicated damper under separate control, or control by the oven cock. Mr. Campbell agrees that when the flue is controlled by a damper, there is reduced consumption and increased temperature in the oven; but he holds that the advantages are counterbalanced by the disadvantages. He suggests that a better utilization of the heat would be effected by having an interior casing at the top and down one side of the oven; and allowing the hot products to escape at the oven top into the beginning of the ⅂ chamber thus formed—travelling along the top, and down the side to a bottom outlet. This would no doubt produce a better efficiency; but would it give uniform distribution of heat in the oven? Like some other men, Mr. Campbell is looking for a reliable method of testing ovens. He is against standardization of ovens at this stage, seeing that we are on the "brink of new discoveries and new ideals." This briefly indicates the points made by Mr. Campbell in this connection. It would be interesting to have the views of readers upon them.

Gas-Coal Supplies.

Reports from the coal-fields indicate that there is much pressure for supplies of gas coal; and there is nothing in this line to spare immediately for export. It is hinted that in some quarters stocking is already going on in addition to meeting current requirements. It is to be hoped that this is not being done to a greater extent than is warranted by prudence in the current circumstances. Too much pressure and too much immediate stocking will naturally help to maintain prices; and the market reports tell us that, under existing conditions, prices are "very firm." As far as possible, gas undertakings should follow a policy that will ease, and not harden, the position. Coal authorities say that supplies will be much more plentiful during August.

Complaints from the Mines.

There is not much other news this week as to the coal position; but what there is is good, except in one particular. This is that there are complaints from the miners—particularly in Derbyshire, Yorkshire, and South Wales—that the colliery owners are taking advantage of the economic position to enforce working conditions not contemplated by the settlement. It is impossible to discuss the rights or the wrongs of this, as there has been a reticence in making public the nature of the conditions in question. If they have anything to do with reverting to cleaner coal, then support would be given to the owners throughout the country. Unemployment, we believe, is one of the troubles—not only due to the fact that there are pits not yet in working order, but because during the war there were many men employed to take the places of absentees at the front, and, on the return of the latter, the collieries became overmanned. Consequently, and through the shorter working time per day, production per man and per unit of wage became seriously reduced. The time for making a change in this respect has arrived, and the pre-war hands should, of course, be given the preference in regard to employment.

National Wages Board.

A good feature of the week is that, subject to approval by the districts, the Executive of the Miners' Federation have decided to co-operate with the Government in working Part II. of the Mining Act, which provides for the creation of pit committees, district committees, and a National Wages Board. If agreed to by the districts, this should have an important bearing upon peace in the coal industry. The National Wages Board was also appointed last week. It consists of 23 members on each side. Mr. Evan Williams is the President for the first twelve months; and Mr. Herbert Smith, President of the Miners' Federation, is Vice-President. Should it ever be necessary for any special purpose, an independent Chairman will be appointed by the Lord Chief Justice. Mr. Frank Hodges and Mr. W. A. Lee, C.B.E., are Joint Secretaries to the Board. The National Board are to determine the wages that are to come into operation on Oct. 1—that is, after the periods have expired for which the figures have been agreed. The guiding principle is the economic position from time to time of the collieries in each wage-unit area. Firms of accountants representing both sides are to present a joint report to-morrow regarding the procedure to be adopted for the determination of the items of the cost of production in connection with the ascertainment of wages under the terms of the agreement. So far, so good. But elsewhere there is public trouble brewing over the increase in the price of coal.

Gas Coke Exports.

In June no gas coke was exported from this country. But in the six months 217,603 tons were dispatched to other countries, and realized in the aggregate £562,383, or £2 11s. 8d. per ton. In the first half of 1920, 365,184 tons of gas coke were exported, and realized £1,861,267, or £5 1s. 11d. per ton. In the past six months 64,891 tons of coke of "other sorts" were exported; the value being £263,085. The figures for the "other sorts" for the June half of 1920 were 630,917 tons, and the value £3,284,695.

CITY AND GUILDS EXAMINATIONS PROGRAMME.

THOSE desirous of becoming candidates in next year's examinations in connection with the Department of Technology of the City and Guilds of London Institute, will be able to glean just the information they will require by consulting the programme for the session 1921-22. This has now been published by John Murray, of Albemarle Street, W., at the price of 3s. 6d. net [postage extra]; and copies may be obtained from any bookseller, or from Messrs. Lamley and Co., Nos. 1 to 5, Exhibition Road, S.W. It contains the general regulations and syllabuses for examinations in technological subjects; and it is stated that all inquiries relating to the work of the Department should be addressed to the Superintendent, Department of Technology, City and Guilds of London Institute, Exhibition Road, S.W.

In addition to the members of the Advisory Committees set forth in the programme, the Institute again point out that they are further able to avail themselves of the advice, among other bodies, of the Council of the Institution of Gas Engineers. The name of Mr. Charles Hunt once more appears as an Honorary Consultative Examiner in connection with gas manufacture; while the Acting Examiners in subjects in which "JOURNAL" readers are interested are: Coke and Bye-Products Manufacture, Mr. D. V. Hollingworth; Coal-Tar Distillation and Crude Intermediate Products, Mr. W. H. Coleman; Gas Engineering, Mr. Samuel Tagg; Gas Supply, Mr. Harry Kendrick; Gas-Fitting, Mr. R. J. Rogers; and Heating and Ventilating Engineering, Mr. A. H. Barker. The examinations in Grade I. of Gas Engineering and Gas Supply and in Grade II. of Gas-Fitting will be held as before.

The following are the dates of the various examinations: Coke and Bye-Products Manufacture, Wednesday, May 3; Coal-Tar Distillation and Crude Intermediate Products (written), Thursday, May 4, and Final (practical), Saturday, May 6; Gas Engineering, Saturday, April 29; Gas Supply, Saturday, May 13; Gas-Fitting (written), Monday, May 1, and Grade II. and Final (practical), Saturday, May 6; and Heating and Ventilating Engineering, Grade I., Friday, May 5, and Grade II. and Final, on Wednesday, May 3. In addition to the syllabuses, a list of text books and works of reference on the subjects of the different examinations is included in the programme.

The Society of British Gas Industries again offer special prizes of £5 5s. and £2 2s. to the first and second candidates respectively at the final examinations in Gas Engineering, Gas Supply, and Gas-Fitting, provided such candidates are eligible under the rules. The Coke-Oven Managers' Association offer prizes of £3 3s. and a silver medal, £2 2s. and a bronze medal, and £1 1s. to the first, second, and third candidates respectively, under like conditions, at the final examination in Coke and Bye-Products Manufacture. A series of prizes for their special subject is also offered by the Institution of Heating and Ventilating Engineers.

GAS EXAMINATION PRIZE WINNERS.

Awards by the Society of British Gas Industries.

THERE has been forwarded to us by the Secretary of the Society of British Gas Industries (Mr. Arthur L. Griffith) the following list of winners of the prizes given by the Society in the City and Guilds of London Institute's Final Examinations in "Gas Engineering," "Gas Supply," and "Gas-Fitting. The Past Lists will be found on p. 154 of last week's "JOURNAL."

GAS ENGINEERING.

First Prize, £5 5s.

Eric Baden Shaw, examined at Burslem Technical School, Stoke-on-Trent.

Second Prize, £2 2s.

Alexander Young, examined at Burnley Technical Institute.

GAS SUPPLY.

First Prize, £5 5s.

Leonard John Weaver, examined at the School of Art, Canterbury.

Second Prize, £2 2s.

Bernard Clarke, examined at University College, Nottingham.

GAS-FITTING.

First Prize, £5 5s.

Thomas Victor Garrud, examined under the Authority of the London County Council.

Second Prize, £2 2s.

Walter Henry Cliffe, examined at the Central Technical School, Liverpool.

New French Synthetic Nitrogen Project.

It is reported that Dr. Daraignez, at a recent meeting of the Federal Council of the Landes, brought forward a scheme for the establishment of a synthetic nitrogen industry in that part of France. The Chemins de Fer du Midi, when they electrified a great portion of their system, utilized the water power of the Pyrenees district for the generation of the requisite electrical energy; and a surplus of this energy is now available. Dr. Daraignez favours the Claude process, and has stated that huge quantities of coke-producing material are available in the Landes for the production of water-gas and hydrogen, and that there also exist close at hand large deposits of both rock-salt and brine—the raw material for the hydrochloric acid which will be used to fix the ammonia. The Landes, as an extensive agricultural province, will be able to consume great quantities of locally produced ammonium chloride.

Economical Working of Boiler Plant.—The Fuel Economy Department of the Federation of British Industries, No. 39, St. James's Street, S.W., have forwarded a copy in book form of the first of the series of Fuel Economy Monographs prepared by them. It is entitled "Practical Suggestions for the Economical Working of Boiler Plant," and was originally drawn-up to direct attention to the principal sources of wastage in boiler plants, and to give some indication of the steps which should be taken to rectify them. The conclusions arrived at are based upon practical experience derived from personal investigation of boiler installations. There are two diagrams—one illustrating percentage heat loss in chimney gases at different temperatures, and the other the chief sources of loss of heat in steam raising. The price of the monograph, bound in stiff covers, is 2s. 6d. net, or by post 2s. 8½d.

BRITISH COMMERCIAL GAS ASSOCIATION.

Report of the Executive Committee, Presented to the General Committee on Monday, July 11.

Finance—Subscriptions.

A list of the undertakings that have agreed to subscribe on the joint basis shows that the total number of undertakings now subscribing on this basis is 313, with an annual output of 150,000 million cubic feet. This latter figure represents just over 61 p.ct. of the industry. Replies to the joint appeal are coming in steadily; and a reminder is being issued shortly to all who have not yet answered.

A gratifying feature of the campaign for the revised subscription has been the number of new subscribers secured to the "B.C.G.A.," and of partial subscribers who have now agreed to the full rate.

It is confidently anticipated that a large number of the remaining undertakings will agree to contribute their share of the cost of the work of the national bodies; and the co-operation of members to this end will be welcomed.

The Manager of the Association (Mr. W. M. Mason) has been devoting a considerable portion of his time to maintaining personal touch with members and interviewing non-subscribers, with satisfactory results.

Publicity Policy.

The limited amount of "B.C.G.A." publicity that has been carried on during the coal dispute has been concentrated largely upon economy and thrift in the home and factory, and on the benefits of a smokeless atmosphere.

Offers of assistance and information to this end have been appreciated by the public; and a large number of inquiries have been received and dealt with.

Having regard, however, to the general position throughout the country, the Executive suspended practically all advertisements during the month of June—especially in regard to district publicity. The Committee now recommend that publicity should be resumed on full scale, and be devoted to the general advantages of gas, having special reference to the abolition of the smoke nuisance.

Members will have noted with satisfaction the widespread interest taken in the effect of the coal stoppage on the atmosphere, and the considerable space devoted to the subject by the press throughout the country.

Coal Smoke Abatement Society's Exhibition.

The Coal Smoke Abatement Society are organizing an exhibition to be held in London in the spring of next year. The Association is co-operating with the Society in this matter, and is represented on the Organizing Committee by the President, the Executive Chairman, and the Editor.

"B.C.G.A." Bye-Products and Coal-Smoke Abatement Exhibit.

In connection with the Association's educational propaganda, steps have been taken to prepare a comprehensive exhibit to illustrate the recovery of bye-products as a result of the scientific carbonization of coal, and also to demonstrate in some measure the evils of smoke and how they are avoided by the use of gas and coke. The exhibit has created a great amount of interest in various parts of the country—notably at the Leeds Gas Exhibition, the Bingley Trades Exhibition, Birmingham, the Royal Show, Derby, the Housing and Health Exhibition, Glasgow, the Efficiency Exhibition, Manchester, the Aldershot Gas Company's showrooms, &c. Prospective bookings are for the British Medical Association's annual meeting and exhibition, at Newcastle-on-Tyne, for the Royal Lancashire Show, and for the Norwich County Show.

The exhibit, which is in duplicate, is available for hire to members for display in show-rooms and at local exhibitions.

Royal Sanitary Institute Congress, Folkestone.

The Manager, Mr. C. F. Botley, and Mr. W. Griffin, attended the above conference as the official delegates representing the "B.C.G.A." The conference, which dealt with a variety of important subjects concerned with public health, was of particular interest to the gas industry in that the programme included speeches by Prof. Leonard Hill and Dr. I. S. Owens on the subject of smoke abatement.

District Conferences.

At the time of the last report, it was only possible to refer to the district conferences that had been held at Torquay and Tunbridge Wells. Since that date most successful meetings have been held at Bolton and Halifax. At the latter, Mrs. Cloudesley Brereton gave an evening lecture, entitled "Domestic Service for Educated Women," which was well received by a large audience, including many of the leading women workers, doctors, architects, scientists, and business men in the district.

Annual Conference.

The annual general meeting and conference at Glasgow has now been definitely fixed for Tuesday and Wednesday, the 27th and 28th of September. A preliminary notice has been sent to all members.

Housing.

The Association continue to give advice and help to members in their negotiations to secure not only that provision is made for the use of gas in the houses, but also that payment on a fair remunerative basis for the work done by gas undertakings is received. The pressure placed on the Ministry of Health to reduce the cost of housing schemes does not make this an easy task; and in some cases no agreement has been found possible.

Use of Gas in Bakers' Ovens.

Steps are being taken to conduct experiments with a view to ascertaining the practicability of converting to gas-firing bakers' ovens now fired by solid fuel.

Commercial Organization Department.

The work of the Commercial Organization Department continues to expand; and very useful service is being rendered to a considerable number of undertakings, especially in the direction of the re-organization of office, stores, and district work on the distribution side of the industry. A report to the Executive by Mr. Holland will be forwarded to any interested member.

(Signed) F. W. Goodenough, *Chairman.*

ELECTRICITY SUPPLY MEMORANDA.

Super-Station Finance and Cheaper Electricity.

The financial prospects of electricity super-stations have been under investigation by Mr. Alfred B. Dawson, the Accountant of the St. Anne's-on-Sea District Council. The results of his consideration of the matter he put forward in a paper read before a recent meeting of the Institute of Municipal Treasurers and Accountants. His conclusions are much the same as one would arrive at by generalization, though this is a highly dangerous practice. It was a well-reasoned and constructive paper; and it contained proposals for dealing with existing generating stations, the methods of payment for existing stations, the financing of the capital requirements of the Joint Electricity Authority, the advantages and the disadvantages of the super-station, and the linking-up of existing undertakings. As to his conclusions, the first is that for a few years the super-stations would not be able to supply so cheaply as many of the existing stations, principally because during the early years of their existence they would be heavily capitalized. On the other hand, he believes that, when the district boards or joint electricity authorities are relieved of the debt of the existing stations, and when the load approaches within reasonable distance of the capacity of the super-stations, they will prove to be more economical, and eventually result in a cheap supply of electricity. In the first part of these conclusions, there is a rude shock for those who believed in the immediate benefit-producing power of the super-station. The super-station cannot perform miracles. It cannot bear the heavy capital charges on the modern basis in respect of capacity, *plus* the burden of the unexhausted but uneconomical stations that would have to be scrapped, and yet supply cheaper than stations erected on the old standards of cost, albeit the higher cost of fuel and labour. The load, too, upon each station must develop considerably before it will pay its own way. So during the early years, people must make up their minds that the probabilities are all in favour of their paying more for current than they would have to do if the suppliers were left to pursue their own course in development along already laid lines. It is clear, too, that the principal sufferers will be those areas already enjoying (as conditions go) a cheap supply of energy. They will have to help to make up for the electrically bad areas. In the second part of the conclusion, there is seen speculation and remoteness of any gain. "When" the district boards or joint authorities are relieved of the debt of existing stations, and "when" the load approaches within reasonable distance the capacity of the super-station, then they should prove to be more economical, and "eventually" result in a cheap supply. Mr. Dawson is pretty safe in putting the matter thus. Taking everything into consideration affecting the financial aspect, it seems to us that it would be better to let the evolution of electricity generation take a natural course from the present state of things rather than bring about a revolution by scrapping and expensive building. Linking-up of good stations, a gradual scrapping of uneconomical ones, and the construction of new stations as needed and as neighbours of gas-works on the line of the Beckton scheme, appear to us to be the systematic and perfectly rational procedure.

Fuel Oil Competition.

The battle of the fuels for boiler firing is going on in dead-earnest. This was seen, apart from outside observation, at the engineering conferences in London the other week. The miners' strike brought oil into prominence as a strong competitor of coal. At the conference therefore much was heard of oil; and powdered coal and colloidal fuel had also a look-in, while gas for boiler firing and for direct driving was not altogether overlooked—particularly the producer gas variety. Gas is well established for power purposes; but its apostles must not let its virtues slip observation by non-users owing to the more pronounced advocacy of the competitors. Liquid, colloidal, and powdered fuels were treated by Dr. W. R. Ormandy in one of the conference papers; and reading it reminds of a few points of which it is well worth making note by those who are engaged in the competitive business for power. It may be taken that fuel oil has an average calorific

value of 18,000 B.Th.U. per lb.; but commercial coal to-day has not, generally speaking, the calorific value that it possessed before the war. Some coals contain as much as 20 p.ct. more incombustible material than it did then. This means that the calorific value is reduced by quite one-fifth. Oil can be burned with a greater efficiency than coal owing to the ease with which the best ratio of air to oil can be attained. Burning oil, an efficiency of 80 p.ct. can be realized with a Lancashire boiler; while with bad coal the limit (according to Dr. Ormandy) would be 60 to 66 p.ct. We think that this is overrating bad coal. But the higher efficiency with oil is not only due to the ease with which the best ratio of air to oil can be attained, but the constancy of the heating is a point in favour of a better duty. This is one reason for the continued conversion of boilers to oil-firing that we see week by week, despite the ending of the coal strike. Dr. Ormandy is of opinion that oil is economical where its price is from 1·75 to 2 times that of coal. Oil containing 50 p.ct. more heat than a present-day (say) 12,000 B.Th.U. coal, and rendering a higher duty, together with the lessened labour for feeding and ash removal—the latter of which is now a very serious business with coal—the quoted figure as to relative price does not appear to be an extravagant one, though some engineers are disposed to put the figures at from 1·5 to 1·75 times the price of coal. The figures, however, do not appear to take into account the capital value of the increased efficiency, and the labour savings. Gas undertakings produce coke and fuel oil for boiler-firing, so that we can take quite a disinterested view of the matter. But we would suggest that there is a danger in carrying oil-firing too far. The record of vagarious prices in the oil market is not likely to be broken in the case of fuel oil any more than in that of other petroleum products. Efficiencies and price chances should be compared with firing by coal and coke in combination.

Colloidal Fuel and Powdered Coal.

The fuel first-named in this side heading does not appear to stand much chance. It has been subjected from its advent in this country to severe criticism, though the use of a small quantity of oil in connection with coal dust is well spoken of. It is quite feasible that a small amount of oil mixed with the dust of low-grade coal would enable it to flash and burn at quite an early stage. With regard to powdered coal, many of the fuel experts are loth to recommend its adoption in this country. It is doubtful whether it would pay to dry and grind the coal, in view of the high efficiency now attainable with modern mechanical stokers. According to Mr. Erith, of the Underfeed Stoker Company, the great cost of the plant will alone kill it in competition with ordinary methods. The capital cost, he says, is four to five times as great; and a large space is required for the grinding and drying machines, while the running cost is also high. The total costs of capital, labour, and power for grinding and drying are nearer 5s. than the suggestion so often seen of from 1s. to 2s. per ton. In an ordinary generating station, with modern well-cared-for plant, it is possible to get with ordinary fuels an average efficiency of 78 p.ct.; and no great increase is likely with powdered coal. Dr. Ormandy asserts that with powdered fuel an efficiency of 80·3 p.ct. is very rarely obtained; so that the small difference in efficiency would only be realized at a considerable cost. Moreover, the fine ash from powdered coal is a real difficulty; and a mixture of coal dust and air is fearfully explosive. Combustible powdered rubbish with a little oil might be worth trying; but we should fear for the efficiency of the boilers. In connection with boiler-firing, therefore, coke and producer gas have coal and oil with which to compete; and coke is winning ground.

Economic Laws and Electrical Plant.

There was great jubilation among the extremist trade union leaders when, during the war and after, success attended their efforts at wage-raising and hour-shortening. Every trade union member was, according to their theory, going to be happier, the standard of living of the workers was going to be raised, a golden era had set in, and in future labour was going to rule. It was all sunshine and words then; but unperceived by the workers the clouds were gathering, and in time the clouds were bound to burst. They have done so; and now things are not as they were. The beautiful dreams have undergone dissolution. Thousands are not earning any wages to-day; thousands are working short time; the standard of living for all these has been reduced to the limit of unemployment pay, with any supplement that the trade unions can afford. Many of the trade unions have found the drain upon their reserves so great that assistance from the collective funds is becoming, if not completely finished, of a very attenuated order. Economic conditions decline to be governed by the extreme element of the trade unions. Their revilings, vapourings, and visionary projects are dissipated or shattered when brought up against concrete facts and economic laws. They fail to recognize that they are (as we all are) only part of a system, every component of which is indispensable to the working of the whole, and that, if one part gains excessive consideration, the time will come when it will react upon the other parts with detrimental force. This is what has happened. The electrical industry is having forceful illustration of this. Sheffield advertised for a 100,000 KW. generating set. The lowest British quotation was between £90,000 and £100,000; and German plant is offered at £49,900! Lower wages, longer hours, more production per man, and the position of the exchanges are the combined causes of the ability of the Germans to do something for about half the amount named in the lowest British tender. We do not know that the matter is settled yet; but if this contract goes to Germany, as go it must unless British prices can be reduced, it means that the employment that plant should give in this country will go to the German workers. Whose fault will this largely be? The same reasons that permit the Germans to undercut us in our home markets are those that are causing us so much loss in our trade abroad, which trade should be giving employment here. How do the trade union extremists reconcile these losses with their theories?

Searching for an Impetus.

The view is general in the electricity supply industry that the price of current will have to be reduced to the consumer before there will be any great accretion of business. They recognize that the prices of energy for such purposes as heating, cooking, and power uses have, in many instances, got far beyond consumers' notions as to what they can afford to pay. Before the war only the fringe of the heating and cooking business had been touched by electricity, because then prices were so much against electricity in relation to useful value realized from the expenditure. The position of the competitive agents has likewise changed; but the high prices cause consumers to look more narrowly still at the value received for money. This is a condition that has to be met. There is another. Many electricity undertakings have consumers of the small order who do not pay, but whom the undertakings cannot refuse to supply. They are positive losses, and particularly in these days of high capital, material, and labour costs. The undertakings naturally want to convert these consumers from the non-paying to the paying state. On all grounds they see nothing for it but the adoption of the two-part tariff, whereby the consumer will pay a solid sum having relation to his demand, and a price per unit in addition. The lump sum will be enough to frighten away some of the small consumers; but as they are non-paying ones, this will not matter. The undertaking would rather have them on the two-part system of payment; but it is better the undertaking should be without them so long as there is a loss. Many electricians are highly pleased over the statutory recognition given to the two-part tariff by the Grimsby Corporation Bill [see "Memoranda" for June 29, p. 731]; and they are urging general legislation to enable the two-part plan to be applied compulsorily and universally. However, at present, there seems to be some disinclination at Westminster to take up the matter. A "Supply Engineer" writing in "Electrical Industries," and, referring to the question of turning consumers involving loss into paying ones, suggests that now is a favourable time to direct the attention of the small consumers to electric irons, cookers, and heaters, so as to endeavour to get them into a remunerative condition. Perhaps it is. But there are other considerations—particularly the cost of appliances and their reliability and efficiency. The "Supply Engineer" admits that many electrical engineers years ago definitely made up their minds that they would not push electric cooking until a perfect oven could be obtained. He adds: "The only comment that can be made on this is that, if that is their attitude, they will wait for ever." This does not look promising for electric cooking.

Price Increases on Coal Costs.

There has been a good deal of discussion in the gas industry as to price movements per therm; and the adopted movement has been 0·2d. Some people fear that the consumers will not understand this. The electricity industry has never troubled whether or not consumers have understood their tariffs and their price movements, whether by percentages on former prices, or by fractions of a penny per unit. The Gloucester City Council, we see, have adopted for electricity a new price movement based on the price of coal. They have taken 25s. per ton as the basic price for coal; and for every shilling variation above this figure the price of electricity is to change by one-fortieth of a penny. The consumers will no doubt find an intellectual recreation in checking the charges in their accounts on this basis. But in view of the costs of plant, materials, and labour in these times, and the uncertainty of the future in these respects, there is some danger in fixing price movements on coal alone.

City and Guilds of London Pass List.—The name of Mr. Harold Bridgwater, of the Tipton Gas-Works, should have been included in the list given on p. 154 of last week's "JOURNAL" of successful candidates in the City and Guilds of London examinations, as having passed in the second class in Gas Engineering.

"B.C.G.A." Annual Meeting and Conference.—The tenth annual general meeting and conference of the British Commercial Gas Association will be held in Glasgow on Tuesday and Wednesday, Sept. 27 and 28, under the presidency of Mr. D. Milne Watson, and under the patronage of the Lord Provost, Magistrates, and City Council of Glasgow. Further detailed particulars and information will be circulated in due course. It is pointed out by the Secretary (Mr. J. C. Walker) that the present Lord Provost of Glasgow is the Association's Past President and very good friend, Bailie Thomas Paxton.

PURIFICATION BY OXIDE OF IRON.

[From the Report for 1920 of Dr. T. Lewis Bailey, Chief Inspector under the Alkali Works Regulation Act.]

(*Concluded from p.* 163.)

Laboratory Investigation.

Considerable difficulty was experienced in the selection of a method suitable for determining the activity of the burnt oxide as measured by the rate of combination of sulphuretted hydrogen and oxygen. The storage of pure sulphuretted hydrogen, or of mixtures containing 50 to 60 p.ct. of that gas, over water and oil was at first thought to be impracticable, on account of the solubility factor, which is by no means a negligible quantity for sulphuretted hydrogen at ordinary temperatures. The earliest attempts, therefore, were directed to the design of an apparatus in which the gaseous mixture was stored in a dry flask, water jacketed, and suitably connected with a reaction vessel of small size (about 27 c.c. capacity), containing 10 grms. of burnt oxide, and connected through a small-bore tube and stopcock with a mercury manometer capable of recording the pressure of the reacting gases, and indirectly (by calculation) their volume. A bunsen pump was attached to the system, to enable the reaction vessel to be evacuated at the start and prior to the admission of the combining gases. This afforded a means of obtaining useful data for calculating the rate of absorption of the gases; but pressure varied from start to finish, and the method was finally rejected in favour of a modified procedure based on the storage of the gaseous mixture over water charged with sulphuretted hydrogen. A suitable connection to a levelling bottle, also charged with sulphuretted hydrogen water, enabled the mixture of combining gases to be maintained at atmospheric pressure throughout the experiment.

Under these conditions, the correction factor for the solution of sulphuretted hydrogen in water was reduced to 0·5 c.c. per 5 min. for a mixture containing 63 p.ct. of the gas, and to 1·8 c.c. per 5 min. for the pure gas.

The apparatus finally approved and employed throughout the series of experiments to be enumerated consisted of the following essential parts.

Gas Reservoir.—Twelve litre capacity, with graduated scale, connected below to a levelling bottle containing sulphuretted hydrogen water covered with a thin layer of oil, and above through a stopcock and small-bore tube to the oxygen generator and sulphuretted hydrogen generator, with secondary connection to a water-seal vessel for discharge of the waste gas into the air.

Sulphuretted Hydrogen Generator.—A three-necked Woulfe's bottle (capacity 600 c.c.), fitted with rubber corks, with suitable connections (*a*) to the gas reservoir, (*b*) to the gas-measuring flask, (*c*) to the levelling vessel containing 20 to 30 p.ct. of sulphuric acid, and (*d*) a 250 c.c. stoppered separating funnel containing a strong freshly prepared solution of ammonium sulphide free from carbonate.

Gas-Measuring Flask.—A water-jacketed distilling flask of about 850 c.c. capacity, with side tube in the neck, and provided with two-holed rubber cork with suitable connections (*a*) to the gas-generator, the gas reservoir, and the water-seal vessel, and (*b*) to the levelling bottle provided with the graduated scale, and charged with sulphuretted hydrogen water covered with oil. The manipulation of this bottle enables the gas-measuring flask to be charged with gas from the gas reservoir or gas generator as desired, and a supply of combining gases to be maintained in the reaction vessel at constant atmospheric pressure throughout an experiment. The gas-measuring flask is connected through the side tube to a two-way stopcock, to enable the gas to be passed to the reaction vessel or sampled by a Bunte burette, for estimation of H_2S (by caustic soda) and of oxygen (by pyrogallate).

Reaction Vessel.—Constructed out of a 50 c.c. pipette cut in two, and with the exit tube cut-off short and sealed. Ten grms. of graded oxide (passes sieve of 15 meshes to inch, retained by sieve of 30 meshes to inch) were employed for each experiment. The oxide was carried on a perforated plate placed somewhat above the bottom of the pipette, to permit of drainage. The vessel above is closed by a three-hole rubber cork carrying (*a*) a thermometer with its bulb embedded in the oxide, (*b*) a connection to the gas-measuring flask, and (*c*) a connection to a mercury manometer and bunsen pump. A suitable stopcock and small-bore tube enable the residual gases to be sampled at any desired moment. During an experiment, the outside of the reaction vessel was lagged with cotton wool or placed in a water bath for regulation of temperature.

Gas-Sampling Tube.—A 10 c.c. tube with stopcock at either end and capillary connections. The tube is provided with a graduated scale, and serves to sample the gases in the reaction vessel. To obtain a sample, the tube, after exhaustion, is connected to the reaction vessel, the latter momentarily cut-off from connection with the gas-measuring flask, and the appropriate stopcock on the gas-sampling tube opened and promptly re-closed. The sample of gas thus obtained is subsequently brought to atmospheric pressure by admitting, first, a little oil, and then distilled water; the volume of gas being finally read-off on the scale. Analysis then proceeds, first for sulphuretted hydrogen by absorption with soda, and then for oxygen by pyrogallate. Correction is made in the analysis for the small amount of residual air (0·2 to 0·3 c.c.) left in the sampling tube on exhaustion.

Procedure.—Having filled the measuring flask from the gas reservoir, and adjusted the pressure to atmospheric at the constant temperature of the water jacket, the reaction vessel is exhausted by the pump, and placed in connection with the gas-measuring flask, and absorption allowed to proceed; the levelling bottle being so manipulated as to maintain the gas at constant atmospheric pressure from start to finish.

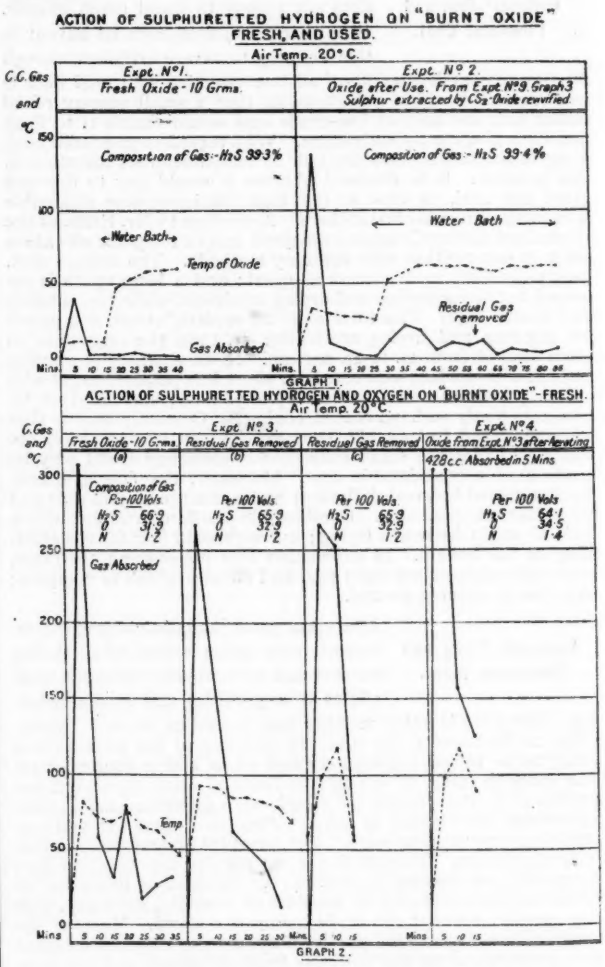
During the experiments, readings of the various thermometers and of the level of water in the levelling bottle were made every 5 minutes, to provide the necessary data to determine the rate of absorption in terms of c.c. of gas at 0° C. and 760 mm.

The composition of the reaction mixture was determined before and after each experiment, as above described, and analysis was also made of the residual gases in the reaction vessel at appropriate intervals. At the end of each experiment, the residual gas left in the reaction vessel was withdrawn into a large exhausted cylinder (1100 c.c.) charged with 25 c.c. of a dilute solution of caustic soda, and the sulphide determined by titration of the acidified solution with N/10 iodine.

The volume readings for gas absorbed were duly corrected (*a*) for H_2S dissolved in the water of the measuring flask, and (*b*) for gas withdrawn by the sampling tube; and a further small correction (*c*) was also applied for residual air left in the reaction vessel after exhaustion at the start.

Results.

It is found convenient to present the results in graphic form. In the graphs, ordinates denote the temperature of the oxide (° C.), and the volume of gas absorbed (in c.c., 0° C., 760 mm.). Abscissæ denote the number of minutes from start corresponding to the respective ordinates. Points of intersection are joined to form curves. Dotted lines connect points corresponding to temperature observations, and unbroken lines to volumes of gas absorbed.


ACTION OF SULPHURETTED HYDROGEN ON "BURNT OXIDE"
FRESH, AND USED.
Air Temp. 20° C.
C.C. Gas and °C
Expt. N°1.
Fresh Oxide - 10 Grms.
Expt. N° 2.
Oxide after Use. From Expt. N°9 Graph 3
Sulphur extracted by CS2. Oxide revivified
Composition of Gas:- H2S 39·3%
Composition of Gas - H2S 39·4%
Water Bath
Temp of Oxide
Residual Gas removed
Gas Absorbed
Mins.
GRAPH 1.
ACTION OF SULPHURETTED HYDROGEN AND OXYGEN ON "BURNT OXIDE" - FRESH.
Air Temp. 20° C.
Expt. N° 3.
Expt. N° 4.
Fresh Oxide - 10 Grms.
Residual Gas Removed
Oxide from Expt. N°3 after Aerating
428 c.c Absorbed in 5 Mins
Per 100 Vols
Gas Absorbed
Temp
GRAPH 2.

Expt. 1.—The curves show the results obtained with fresh oxide. The relatively large absorption, noticeable on first admission of gas, is attributed in part to the presence of free alkali. After 10 minutes' exposure, the absorption rate dropped to zero, and the oxide remained inactive even when the temperature was raised to 60° C. by means of a water bath. No colour change was perceptible in the mass.

Expt. 2.—With burnt oxide after repeated use (free sulphur removed by extraction with carbon bisulphide and redrying in air), the activity of the material towards pure H_2S is greatly increased. Free alkali would here be absent; but the marked darkening of shade noticeable on exposure of the revivified product to the gas (brick red becomes light grey), indicates

that the surface of the oxide is gradually attacked on continued exposure to the joint action of sulphuretted hydrogen and oxygen, and that the material is approaching in activity the poorer qualities of bog ore. After 25 minutes' exposure to the gas, the rate of absorption fell to zero, but showed slight recovery on raising the temperature to 60° C.

Graph 2.—Fresh Burnt Oxide.

$H_2S : O : : 2 : 1.$

Results in every case indicate a large initial absorption of gas—256 c.c. to 428 c.c.—accompanied by a rise of temperature of 50° to 105° C. The absorption rate then rapidly fell, and with it the temperature of the oxide.

The catalytic activity of the oxide appears to be closely related to the amount of residual nitrogen present; for on exhaustion the full activity of the oxide was restored (see Expt. No. 3), and the effect was even more marked when the material was exhausted and then aërated prior to re-exposure to gas (Expt. No. 4). The tendency of the nitrogen gas to accumulate in the reaction vessel is illustrated by the following results:

Experiment.	Average Temperature of Oxide.	Average Gas Absorbed over Test Period.	Nitrogen in Residual Gas.
	° C.	C.C. per Min.	Per 100 Vols.
No. 3—(*a*) Fresh oxide .	63	15·8	17 (15 min. from start).
(*b*) Oxide from (*a*) after exhaustion	80	19·3	24 (end of expt.).
(*c*) Oxide from (*b*) after exhaustion	82	38·5	39 (end of expt.).
No. 4—Oxide from (*c*) after exhaustion	83	47·5	36 (end of expt.).

H_2S : O varies from 2·6 : 1 to 1·7 : 1. Free sulphur from 30 to 40 p.ct.

Results afford undoubted evidence of steady catalytic activity with sulphuretted hydrogen in excess, equally as with oxygen in excess. The activity of the oxide after repeated use was markedly less than that of the fresh material. The activity was raised by extraction of the sulphur with carbon bisulphide, but even then was low compared with that of the original oxide (Graph 2). Raising the temperature by means of a water bath was favourable to activity. Thus:

Experiment.	Average Temperature of Oxide.	Average Gas Absorbed.
	° C.	C.C. per Min.
No. 5 (*a*) Revivified burnt oxide	57	10 1
(*b*) Oxide from (*a*). After exhaustion .	51	6·7
No. 6 (*a*) Oxide from No. 5 (*b*). Revivified .	30	2·3
(*b*) Temperature raised by water bath .	55	3·3
No. 7 (*a*) Oxide from No. 6 (*b*). Revivified .	30	2·4
(*b*) Temperature raised by water bath .	60	5 6
No. 8 (*a*) Oxide from No. 7 (*b*). Revivified .	26	1·3*
(*b*) Temperature raised by water bath .	62	3·1
No. 9.—Oxide from 8 (*b*). Extracted with CS_2 and revivified.	54	6·2

* First 10 minutes excluded.

The question arises, What is the nature of the catalytic action that ensues? Is the sulphuretted hydrogen finally obtained in the form of free sulphur, substantially as in the oxide purification process, or mainly in the form of oxidized sulphur compounds, as with wood charcoal? Analysis of the oxide before and after use affords undoubted proof that the primary action is what may be termed "Claus reaction," and proceeds on the lines of the equation:

$$H_2S + O = H_2O + S,$$

94 p.ct. of the sulphur entering the reaction vessel as sulphuretted hydrogen being obtained as free sulphur in the final product, and 6 p.ct. only as sulphur in other forms, including the whole of the sulphuretted hydrogen absorbed by the free alkali and ultimately converted into oxidized sulphur compounds, thiosulphate, sulphate, &c., together with losses inseparable from the handling of the gas.

The oxide continued active until the free sulphur content had risen to 40 p.ct. (Expt. No. 8, Graph 3). The material then showed signs of exhaustion; but its activity was restored by extraction with carbon bisulphide and aëration (Expt. No. 9, *ibid.*). The free alkali is satisfied very rapidly. Indeed, the amount of alkalinity determined by titration of the alkali extracted by hot-water treatment is only equivalent to 1 c.c. of H_2S per 10 grms. of oxide used; and the material may be said to be "conditioned" by one treatment with sulphuretted hydrogen and oxygen. Thus:

Analysis of Burnt Oxide Before and After "Conditioning."

Per 100 grs. of Undried Material.

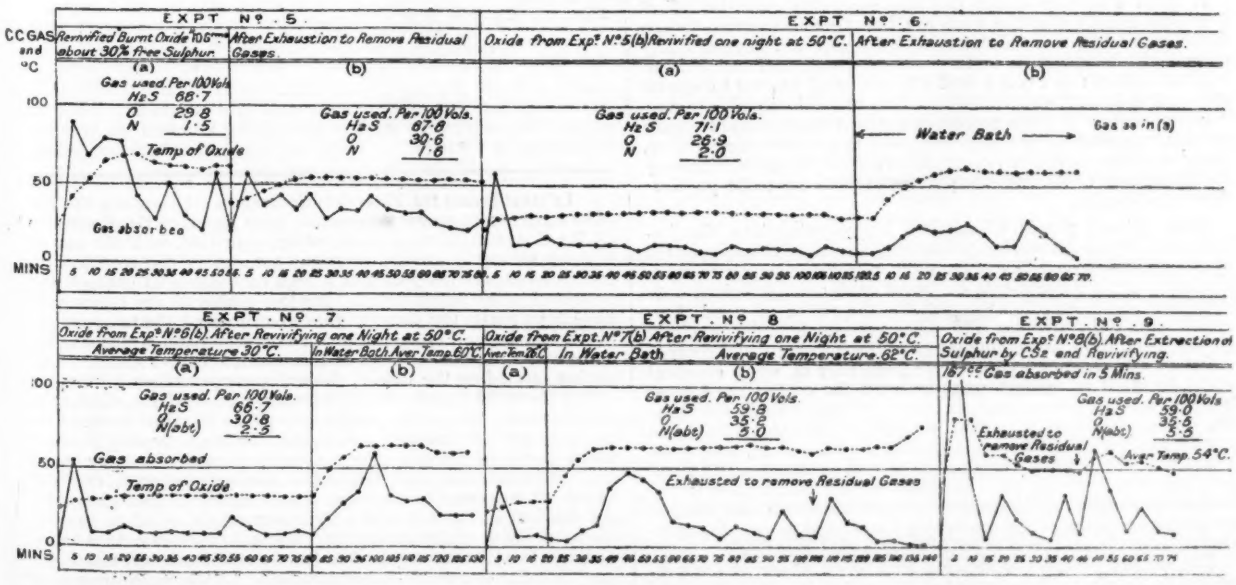
	Before.	After.
Appearance	Brick red.	Brick red.
Alkalinity, in terms of H_2SO_4. Grms.	0·05 (= 11 c.c. H_2S)	*Nil.*
N/10 iodine for thiosulphate, &c. .	c.c. 14	29
	Grms.	Grms.
Moisture	—	3·20
Sulphur—		
As sulphate and other forms soluble in water	0 20	0·30
Obtained by further extraction with dilute HCl	—	0·05

The material remains neutral to methyl orange indicator, even after repeated use, and when finally spent contains traces only of ferrous sulphate. Neutralization of the free alkali causes no diminution of activity (Graph 2). It is reasonable to assume, therefore, that the slight increase in the amount of sulphur oxidation products, noticed above, is due to the presence of the trace of free alkali associated with the burnt oxide, rather than to secondary reaction involving the catalyst itself. On the other hand, removal of the free sulphur favours activity; and the behaviour of the oxide after prolonged use suggests that the catalyst itself is slowly attacked and finally approaches, in the surface layer, the condition of hydrated oxide (Expt. No. 9. Graph 3).

It is of interest to note that bauxite is also active at relatively low temperatures. The main reaction—$H_2S + O = H_2O + S$—is stated to proceed most favourably at 300° C., and the injurious secondary reaction—$2\,H_2O + 3S = 2\,H_2S + SO_2$—to be feeble at 230° C.

The general conclusions reached above with respect to the simple character of the reactions that occur when mixtures of sulphuretted hydrogen and oxygen ($H_2S + O$) act on the burnt oxide, is supported by an examination of the residual gases left in the reaction vessel. Gas analyses could not be multiplied during the course of an experiment. Time would not permit of this; nor was it considered desirable to withdraw even a small body of

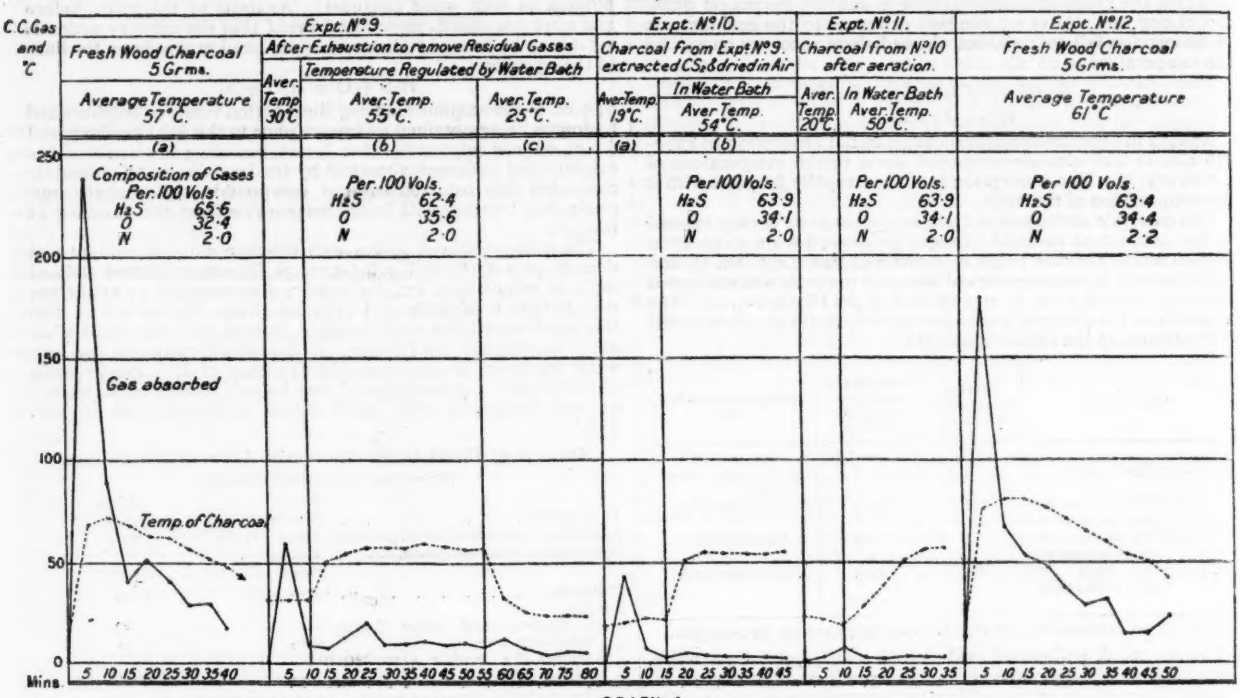
ACTION OF SULPHURETTED HYDROGEN AND OXYGEN ON "BURNT OXIDE".
(AFTER REPEATED USE & REVIVIFIED)
AIR TEMP. 20°C.


EXPT. Nº. 5.
EXPT. Nº. 6.
CC GAS and °C
Revivified Burnt Oxide 106 about 30% free Sulphur.
After Exhaustion to Remove Residual Gases.
Oxide from Expt. Nº 5(b) Revivified one night at 50°C.
After Exhaustion to Remove Residual Gases.
(a)
(b)
Gas used. Per 100 Vols. H2S 68·7 O 29·8 N 1·5
Gas used. Per 100 Vols. H2S 67·8 O 30·6 N 1·6
Gas used. Per 100 Vols. H2S 71·1 O 26·9 N 2·0
Temp of Oxide
Gas absorbed
Water Bath
Gas as in (a)
100
50
0
MINS
EXPT. Nº. 7.
EXPT. Nº. 8
EXPT. Nº. 9.
Oxide from Expt° Nº6(b). After Revivifying one Night at 50°C. Average Temperature 30°C.
In Water Bath Aver Temp 60°C.
Oxide from Expt. Nº7(b) After Revivifying one Night at 50°C. In Water Bath Average Temperature 62°C.
Oxide from Expt° Nº8(b). After Extraction of Sulphur by CS2 and Revivifying.
Gas used. Per 100 Vols. H2S 66·7 O 30·8 N(abs) 2·5
Gas used. Per 100 Vols. H2S 59·8 O 35·2 N(abs) 5·0
Gas absorbed in 5 Mins.
Gas used. Per 100 Vols H2S 59·0 O 35·5 N(abs) 5·5
Gas absorbed
Temp of Oxide
Exhausted to remove Residual Gases
Aver Temp 54°C.

GRAPH 3.

ACTION OF SULPHURETTED HYDROGEN AND OXYGEN ON WOOD CHARCOAL.

Air Temp. 18° C.



GRAPH 4.

gas at critical periods in a continuous experiment. But the following analyses are cited as supporting generally the conclusions stated above:

Experiment.	Total Volume of Gas Entering the Reaction Vessel. c.c. 0° C. 760 mm.	Residual Gases Left at the End of the Period. Found. Volume. c.c.	Composition per 100 Vols. H_2S.	O.	N.	Calculated for Catalytic Reaction $H_2S + O = H_2O + S$. Volume. c.c.	Composition per 100 Vols. H_2S.	O.	N.
No. 3 (*a*) .	415*	15·1	82	1	17	18·8	68	..	32
(*b*) .	595†	11·5	76	..	24	8·5	12	..	88
(*c*) .	595	18·7	59	2	39	8·6	8	..	92
No. 4 . .	723	8·0	63	1	36	29·1	..	62	38

* First 15 minutes of test period. † First 25 minutes of test period.

In Expt. No. 4, where the proportion of oxygen (34·5 O : 64·1 H_2S) was markedly greater than that demanded by the equation $H_2S + O = H_2O + S$, there is evidence of secondary oxidation; oxygen being practically absent from the residual gases, while theory would indicate an oxygen content of 62 p.ct.

It is, of course, probable that the secondary oxidation effect would be greatly modified were the burnt oxide exposed to the action of a mixture of sulphuretted hydrogen and oxygen freely diluted with inert gas, as in the case of crude coal gas with an H_2S content of 1 to 2 p.ct.; and it would be of interest to extend the work to include experiments on lines more closely akin to gas-works practice. But the procedure detailed above would be quite unsuited for such an investigation; and large-scale experiments, under working conditions, could alone furnish the data necessary for decision as to the suitability of burnt oxide for oxide purification in gas-works.

Time did not permit of detailed investigation into the behaviour of wood charcoal in presence of a mixture of sulphuretted hydrogen and oxygen ($H_2 + O$) under conditions similar to those described in the experiments on burnt oxide; but sufficient data were obtained to establish the fact that the action of wood charcoal is essentially different from that of the oxide under precisely similar conditions respecting temperature, pressure, and composition of the reacting gases. Five grms. only of wood charcoal could be used as against 10 grms. with the oxide; the former being so much more voluminous. With the burnt oxide, reactions are characterized by maximum production of free sulphur and minimum production of sulphur oxidation compounds; with wood charcoal there is marked production of acid products, with limited production of free sulphur. Analysis of the residual gases in the case of wood charcoal indicates that results are here complicated by a large occlusion of the combining gases; and no simple representation of the reactions is possible, as with burnt oxide.

The results of the experiments with wood charcoal are presented in Graph 4. A large initial absorption is noticeable with the fresh material. There is doubtless occlusion of gases, apart from the absorption of sulphuretted hydrogen by free alkali, and the contraction of volume due to reactions induced catalytically. Judging by analysis, the amount of free alkali—probably as carbonate—would be small, hardly equivalent to more than 10 c.c. of H_2S. Thus:

	Ash obtained on Ignition of Wood Charcoal, 10 Grms. Grms.
Total ash	0·80
Alkalinity, calculated as sod. carbonate. . . .	0·65

(equivalent to 137 c.c. H_2S, 0° C. 760 mm. For 5 grms. (the weight of charcoal used) the volume would be less than 7 c.c. H_2S).

From the initial high rate of absorption with the fresh material, the rate fell rapidly to a very low figure, and ultimately approached zero. Raising the temperature of the charcoal by means of a water bath had little effect on the rate of absorption. Removal of the free sulphur by carbon bisulphide, followed by aëration and drying at 70° to 80° C. (Expt. No. 10), had no beneficial effect.

Experiment.	Average Temperature of Charcoal, °C.	Average Gas Absorbed. C.C. per Min.
Expt. 9.—(*a*) Wood charcoal. Exhausted prior to use	57	13·2
(*b*) Charcoal from (*a*), exhausted	—	—
(i) Water bath, hot. . .	55	2·0
(ii) Water bath, cold . .	25	1·0
Expt. 10.—Charcoal from Expt. 9 (*b*) (ii). After extraction with CS_2 and drying in air—		
(*b*) Water bath, hot . .	54	0·6

Exhaust Steam for Water-Gas Generators.—Discussing the use of exhaust steam on gas-works, Mr. John Ryan, of the Rochester (N.Y.) Gas and Electric Corporation, says that, with the use of exhaust steam in certain water-gas generators, the trouble first encountered was the fact that a high carbonic acid content was produced in the finished gas. The low quality of the steam may have been partly the cause of this, as it lowered the temperature of the fuel bed. For the supply of exhaust steam, a pipe was required several times as large as that needed for live steam. The clinker formed on the sides of the water-gas machine with the use of live steam was nearly, and in some instances entirely, eliminated when exhaust steam was employed. This fact was credited to the quality of the exhaust steam, and the large opening through which it entered the generator. Passing through this large opening, the steam goes over the entire fire-bed; whereas the live steam, on entering the machine, shoots across to the other side, and the fuel on the side where the steam enters is left to fuse to the brick lining of the generator. The exhaust steam does away with the hard labour required to bar-down the clinker, and saves the brick lining and the generator shell. It also saves time, and increases the capacity of the machine per day.

PERSONAL.

Mr. W. T. BUCKLAND, the Works Manager of the Chesterfield Gas-Works, who will be shortly retiring, is to have an allowance of £285 per annum, and, in addition, is to be given a retaining fee of £25 a year, in consideration of his being at call whenever found necessary.

Mr. P. M. SIM, of the Johnstone Gas-Works, has been appointed Manager to the Buckie Gas Light Company.

Mr. S. HALL, of Birmingham, is recommended by the Edinburgh Corporation Gas Committee for the position of Gas Sales Superintendent.

OBITUARY.

JOHN WILTON.

At the ripe age of 82 years, there passed away, on the 21st inst., at Wanstead, Mr. John Wilton, late Engineer of the Bow Common and Silvertown stations of the Gas Light and Coke Company, from whose service he retired about the end of 1911, after over forty years of good and continuous work for the undertaking. He took with him into retirement the goodwill and good wishes of all who had been connected with him.

Mr. Wilton's association with the Company dated from the absorption of the Victoria Docks Gas Company under the Act of 1870. Before that time, however, he had been in charge of the Silvertown works, to which he had been appointed by the Victoria Docks Company in 1864. His experience of gas-works commenced in 1858, when he was associated with his brother, Mr. W. G. Wilton, then Engineer of the Ratcliff Gas-Works, which in 1869 became, by amalgamation, the property of the Commercial Gas Company. It was in 1884 that Mr. Wilton was appointed Engineer of the two stations at Silvertown and Bow Common—the former having been maintained for many years as the Company's coal-testing station.

In an appreciative account of Mr. Wilton's work, published at the time of his retirement in the Gas Light and Coke Company's "Co-Partners' Magazine," the writer said: "Mr. John Wilton's name will be inseparably connected with the successful installation of inclined retorts in the Company's works. The Coze retorts, at Kensal Green, had proved unsuccessful, chiefly owing to defects in the mechanical arrangements connected with their feeding; and an installation of inclined retorts, equal to the daily output of a million cubic feet of gas, on the 'Brentford' system was decided upon at Bow Common. It is enough to remark that, under Mr. Wilton's assiduous attention, in the early days of its working, this installation of inclined retorts became the forerunner of the many installations which so successfully replaced the older hand-worked 'horizontals' which had exclusively ruled in the Company's in-town stations."

SIXTY YEARS AGO.

[From the "Journal" for July, 1861.]

Scotland and Cheap Gas.—The cheap gas movement in Scotland waxes and wanes, rises, culminates, and declines, with the flux of time. As the cry of cheap gas is heard in one town, it ceases in another; and each place in its turn greets Mr. Flintoff with cheers, listens to his lectures, makes a pretence to form a consumers' company, and then gradually drops into a state of quiescence. Stirling was the last city he favoured with a visit; and, in the paper that records his success in that ancient scene of strife, there are woeful denunciations of the desertion and back-sliding of Glasgow and Edinburgh, where he was so recently received with acclamations. The "North Briton," which enlightens its readers by publishing a series of articles on the gas supply of Scotland, makes complaint in no measured language of the falling away of these two cities from the cause of Flintoff and cheap gas; and, if the representation of the state of the gas-works in Scotland given by the writer of the articles be correct, everyone should join in the lament. "Without a single exception," it is stated, "their works are a mass of engineering blunders, their pipes are thoroughly oxidized, their gasometers are not half large enough, and their works, instead of being kept in proper order, are generally charnel-houses and pest-holes, through the defective state of their apparatus." This is a favourable specimen of the style, the freedom of assertion, and the absence of truth, in which the writer indulges when professing to give his readers information respecting the gas supply of Scotland. Such writing as this cannot, surely, be indigenous to "Modern Athens." It must be exotic; and we strongly suspect that Fleet Street was its native *habitat*.

The Fire in Wood Street.—The actions brought against the Great Central Gas Company for having, through the alleged negligence of their servants, set fire to Mr. Morley's premises in Wood Street, have ended differently from our expectations. The second action, brought in the name of Mr. Sturgeon, the adjoining neighbour of Mr. Morley, came on for trial on Tuesday week; and, after it had occupied the greater part of three days, and before the plaintiff's case was concluded, the Great Central Company compromised the three actions, and consented to pay £25,000 and costs, to be released from all liabilities. The immense responsibility which this result throws on all gas companies will, we have no doubt, be considered a sufficient reason for devoting so large a space in our present number to the report of the trial. The risk to which the neglect or carelessness of a servant may expose the shareholders of gas companies is now placed strongly before them; and it is especially onerous on those companies that are not incorporated with limited liability, as every shareholder in such companies is liable to the extent of his whole fortune for damage that may be caused at any hour by an incompetent or careless servant.

AUTOMATIC CONTROL OF WATER-GAS PLANT.

Excellent results have been secured by Mr. S. A. Goodman, of Norfolk (Va.), by automatic control of a Lowe water-gas set, together with the installation of a waste-heat boiler. Describing the control in a paper read before the Southern Gas Association of America, he said that it consists of one small ¼ H.P. motor, directly connected to a reduction gear-box, where the final gear running at a given speed connects to another set of gears or gear-shaft, to give the required cycle for operation—namely, 4½, 5¼, 5¾, or 6½ minutes. These gears operate cam shafts. The cams are adjustable to allow the closest regulation of the blast, oil, steam, and stack valves, each of which has a hydraulic cylinder directly connected for its operation by a set of Critchlow valves which, in turn, are operated by pilot valves in the control cabinet—except the oil-valve, which is operated directly by one of these pilot valves. Therefore, with these pilot-valves being operated at a given speed, the length of blow and run can be kept constant; the proportions being regulated to the most economical point of efficiency, which is practically impossible by hand operation. A signal light system or electric alarm system consists of an extensive electric wiring switch-and-light installation, which is flashed by lights into a glass-fronted box, partitioned in compartments, showing the relative on and off positions of the valves operating the machine. There is also a relay system operating a gong, which rings in case the valves do not operate correctly. However, the signal light system he considers an unnecessary expense; for he feels that the operations would progress without its use. With automatic control, one is practically independent of the skilled labour situation, as any man with ordinary intelligence can successfully handle the apparatus. With at least fifteen operating hours on a Lowe carburetted water-gas machine, in good condition, one could work with an average of 30 lbs. of generator fuel and 3·2 gallons of oil on a 580 B.Th.U. basis a mile from the works.

PUBLIC OWNERSHIP OF DISTRIBUTION SYSTEMS.

As President of the Indiana Coke and Gas Company, Mr. Warren S. Blauvelt has suggested a scheme by which he thinks the evils traceable to the political control of a socially essential manufacturing and merchandizing business might possibly be avoided. His idea is to let the community purchase from the gas company, at a fair present valuation, the entire distribution system, paying for it in city bonds, the interest on which and a sinking fund would be provided by a tax levied solely on land values. Thus the community would acquire ownership of the monopolistic feature of the gas business; and the cost thereof would be paid by those who have received the direct financial benefit arising from the existence of this distribution system. The company should be allowed the free use of the gas highway—just as the coal dealer, the grocer, or any other person, is allowed the free use of the street. Government control of the company should be eliminated, except in the following respects: Discrimination should be prohibited in rates or service. This is not to be interpreted as meaning that universal flat-rates should prevail regardless of fluctuations in demand and of other considerations which affect the cost of service. Provision should be made that standards of gas service once established should not be lowered, nor gas rates raised, without giving at least six months' notice in advance. The free use of the distribution system by the gas company would be always subject to the condition that the company would have this right subject to being dispossessed on (say) eighteen months' notice, whenever responsible people might come forward with a proposition, meeting with the approbation of the authorities, and guaranteed by proper security, to render either better service or satisfactory service at lower rates. In such circumstances, the existing company could best satisfy its desire to retain a profitable business by rendering service of such quality and at such rates that there would be no inducement for any other group of responsible capitalists to offer to take over the business. Obviously the existing company, as a going concern, could render better service at a lower cost than any organization not yet formed.

South Metropolitan Gas Company's Interim Dividend.—The Directors of the South Metropolitan Gas Company have declared an interim dividend at the rate of 5 p.ct. per annum on the ordinary stock for the past half year.

SCOTTISH JUNIOR GAS ASSOCIATION

(EASTERN DISTRICT.)

The postponed Annual General Meeting of the Association was held last Saturday in the Heriot Watt College, Edinburgh.

Mr. J. W. M'LUSKY, Engineer and Manager to the Glasgow Corporation Gas Department, gave an address, portions of which will be found on p. 219 of this issue.

Mr. D. CAMPBELL (Anstruther) also delivered the following

PRESIDENTIAL ADDRESS.

Gentlemen,—When you did me the honour of electing me President of your Association last year, I thanked you then; and now at this stage of the proceedings I should like, just in a sentence, to express to you my gratitude and indebtedness for the distinction you have conferred upon me. This office has been held in past years by men of no mean order, who have added lustre to the position by their worth and character. It has been my humble endeavour, in fulfilling the duties of the presidential chair, to follow in their footsteps as far as possible; and I feel proud to have my name placed alongside such predecessors.

GAS FOR COOKING AND HEATING.

The continual expansion of the gas industry for the past century has been one of steady progress; and one may be forgiven perhaps from drawing a parallel to the growth of democratic government and the freedom of the franchise in this country. Other countries have had their hectic decades and turbulent periods in achieving some measure of constitutional government; but except for the Civil War in Cromwell's time, the only internal disturbances experienced at home have been local and transitory for the past 150 years.

Similarly our industry—I say "ours" advisedly, as every one of us can testify how it makes us assume the possessive tense by a bond of interest and a round of unremitting toil and watchfulness—has gradually progressed step by step from the time of Murdoch up to the present day; and though on all sides we have seen at various periods other industries in a state of chaos and upheaval, or in a state of ups and downs, yet until the period of the late World War we passed on practically undisturbed. It is scarcely to be wondered, therefore, that one of the first things in the gas industry that strikes an outsider is its conservative attitude. In this we are typically British; and while some of the prophets crying in the wilderness ridicule us for this attitude, yet for my part this hereditary trait of the industry is very vital, as our whole commercial success depends upon our reliability in its widest sense, and any advances we may make are the result of careful experience and trial which made for steady solid progress. It is no wonder therefore that we are loth to part with the old for the new, but stick to the old axiom "The proof of the pudding is in the eating," and cry to the mouthpieces of the various winds of doctrine "Demonstrate and prove yourselves worthy not by word but by facts."

But this policy of make haste slowly does not mean a lack of receptivity and inertness as the more impulsive people claim; for bearing in mind the parallel of the "hare and the tortoise," and comparing the progress in carbonization and distribution in the past decade, together with the mighty part the gas industry played in the strenuous times from which we have emerged, we can only conclude that our predecessors built wisely and well and with due thought for the future. It behoves us then to be receptive and painstaking, to keep our eyes in front to enable the glorious record to still be one of onward, to permit us to still be of vital service to the public which we serve.

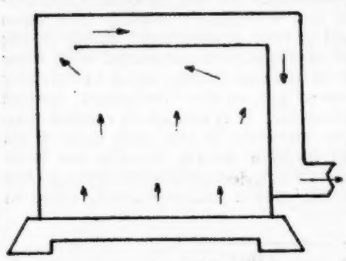
In this wide range of science which is included in our bounds, the fields of nearly all professions are called in to minister to our needs. We use the chemist, the engineer (civil, mechanical, and electrical), the architect, the politician, the accountant, and even the doctor is called on for his advice and opinion. It is small wonder then that, in this vast region of experiment and practice, we have at all times met quacks and impostors, who have endeavoured to exploit the gas consuming public—so much so that gas undertakings have been compelled to form themselves (to borrow a name) into a gas consumers' association, to sieve the bad from the good and to be able to stand in a position and say: We not only supply a commodity which is useful and economic, but also offer you appliances of every description to use this commodity to its best advantages, and place at your disposal the advice of experts in every branch whose sole aim is the best fulfilment of your requirements and who have no private axes to grind. So that from being sellers of gas alone we became sellers of gas *plus* service; and as we advance along these lines, so will our prosperity increase. But let us always bear in mind our responsibility too; for our decisions of to day, either understood or expressed, become the laws of to-morrow, and, accordingly, as our decisions are right or otherwise so shall we advance or retard the progress of our industry.

Bearing this point of view in mind, I should like to draw attention for a little while to some of the more well-known domestic appliances. I think I may safely say, without fear of contradiction, that practically all gas appliances in use in the home to-day have been afterthoughts with the exception of lighting. Lighting fixtures have come to be considered as things which are as necessary to buildings as the doors and windows; but up to the present our cookers, gas fires, circulators, and geysers are all in the nature of additions generally at the tenants' or the gas undertakings' expense. On these lines evolved the gas-cooker of to-day. The hot plate height is limited to about 30 in. to 33 in., and its width must not exceed that of the oven below it, as it is more often than not intended to go into a confined space, generally a corner. It is well within all our recollections when practically all cookers had ovens extending to the floor; but experience dictated that, on account of dust and cleanliness, it was a decided advantage to raise the cooker on a stand and leave the floor space open for cleaning purposes.

This necessitated shortening the height of the oven, as the height of the hot plate was already fixed. I am of the opinion that this shortening was an advance in cooker construction, as the bottom 9 in. in the old cookers was never used, due to the uneven distribution of heat there. It is only at the present time that any steps have been taken to ensure that an oven shall be supplied with an absolutely even heat throughout.

Another advantage secured by shortening the height of the oven is the fact that there is less surface for heat losses. Proceeding on these lines, I venture to predict that the oven of the future will be in the form of a cube (thus offering the largest cubical contents with the smallest outside surface for heat losses), and so arranged as to give an absolutely even heating throughout; the intensity of the heat or temperature being under easy control. We all know that ovens are used for the greater part of the time with the cock at less than half-on; and I would suggest that cookers should be supplied with some method of making the oven flames visible, so as to assist in regulating the temperature—the cock to be allowed a much larger angular movement when nearly in the full off position. This has been done in one cooker by extending the groove; but, unfortunately, this groove gets filled with grease and interferes with its working. Another method of control would be by means of a thermostat of robust and simple construction, which could be varied through a wide range of temperature and supplied with dial indicating temperatures, or simply marked Bread, Pastry, Fish, Meats, &c., the controlling mechanism for the change of temperature to have a pointer to indicate the required state or the scale.

Various methods of flue control have been tried at different times; and I must confess I am rather in favour of an alteration to the shape of the flue, as illustrated, as has been marketed by one firm, rather than in a complicated damper, either under separate control or controlled by the oven cock.



Suggestion for Utilizing Oven Waste Heat.

Some experiments with flue control came under my notice; and I give the the results herewith, hoping they may prove of interest.

An ordinary high-grade cooker by a well-known maker was used. One series of tests was carried out with the cooker as received, and another series on the same cooker with a damper in the flue worked by the oven cock. The following figures resulted:

1.—A consumption of 13·2 c.ft. per hour in ordinary oven maintains a temperature of 343° Fahr.
12 c.ft., however, in the oven with flue control maintained 345° Fahr., or a saving of 1·2 c.ft., or 10 p.ct.

2.—A consumption of 12 c.ft. in ordinary oven maintained a temperature of 324° Fahr.
A consumption of 12 c.ft. in controlled oven maintained a temperature of 345° Fahr.

The oven, with and without control, heated up identically; so that the saving, as would be expected, only took place after the gas was turned down. So that, in ordinary practice in cooking a joint and allowing gas full on for ¼ hour, placing joint in oven and leaving gas full on for five minutes, and then reducing and cooking for two hours, we would get, gas used—

37 c.ft. controlled,
39·4 c.ft. ordinary, or a saving of 6 p.ct. in two hours.

Taking into account the extra complications and the danger of the damper sticking and causing the oven to smother-out, I feel inclined to say, so far as my experience goes, that flue control by means of dampers at present offers disadvantages that outweigh the advantages.

There has been very little published on testing of cooker-ovens. I think, however, it would be of great service to all if someone would give a reliable method of testing and comparing two ovens. The only formula I know was one published some time ago, and is given herewith again—

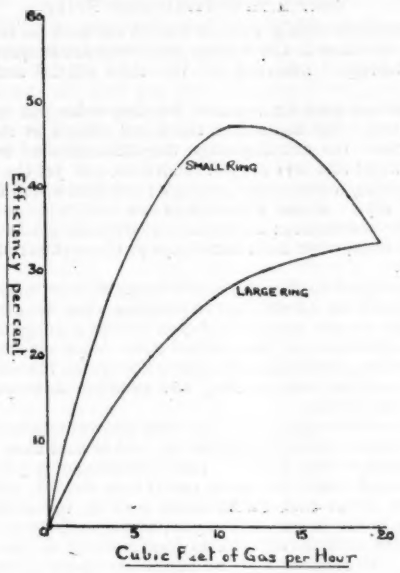
$$\frac{\text{Oven volume in cubic feet} \times \text{temperature.} \quad \text{Rise} \times 1000.}{\text{Gas rate} \times \text{calorific value.}}$$

The only objection I can see to this is the fact that the rise in temperature is not strictly proportional, and to compare two cookers it would be necessary to produce practically the same temperature rise.

It would also be of great assistance if some standard boiling ring testing method were put forward, as the efficiency is governed by the gas-rate and the size of the kettle used; as well as the size of the ring. As tests reported usually leave one or more of

these data out, comparison is impossible. The chart herewith shows a series of tests of one large and one small ring at various gas rates.

EFFICIENCY OF GAS-RINGS.



I suppose that the mild steel hotplate bars are about to become a thing of the past; and I must confess I view with some dismay the reintroduction of brittle cast-iron bars. I am afraid their replacement will be a costly item.

Time will not warrant me saying much more on the question of cookers, except that I feel any suggestion as to standardization in cookers is immature, as we are on the brink of new discoveries and new ideals in this connection. I am afraid, however, it will be another case of lengthy research and controversy, such as took place with gas-fires, before we arrive at any settled convictions, and the so-called standard of to-day will be on to-morrow's rubbish heap—a costly process for undertakings with cookers on simple hire.

I do not wish to be misunderstood with respect to gas-fires when I say anything about settled convictions, and should not like you to regard me as saying we have reached finality even in these highly specialized apparatus. The gas-fire up to the present has been an afterthought, like the cooker; but there is no doubt it is further advanced in its evolution than the gas-cooker. We have to-day many splendid examples of gas interior mantel registers; while a fire of fairly recent introduction solves, I think, the afterthought question admirably, making a neat job through being possessed of the necessary elasticity in all dimensions, and perfectly hygienic by fitting well under the existing canopy.

Now with a range of appliances of this description I feel myself that it is a great pity that we, as gas undertakings, have not been able to absorb a larger volume of gas heating business in the new "D.B.M.S." scheme. Gas interiors or gas mantel registers, to my mind, should be installed in all bedrooms under these schemes; but we are prevented from installing them owing to initial cost.

We can take it that comparatively few coal-fires are used or will be used in the bedrooms of the new houses that are in course of erection; while a gas mantel would have a reasonable chance of occasional use, and a certain chance in case of illness. I think you will agree with me on this point; so I need not labour the *pros* and *cons* of the case. Further, there is no doubt that a gas-fire will be installed as an afterthought in many of these rooms, an additional expense to someone. What a pity then, it seems not to have been able to have brought interest and influence to bear, or financial assistance, and had gas-grates installed in all these places, where I am sure we should have increased our sales of gas enormously. That little comfort ensured by a gas-fire on a cold night for half an hour has only to be tried to be appreciated, and I am sure would have resulted in what I may be pardoned for so terming "the gas-fire habit." This load, too, would occur at times when we were able to deal with it; and I think it is a business we would do better to cultivate more freely.

We have also a new proposition put before us in the attitude of the gas consumer of to-day. He has been bled on all sides, and is, like a beaten dog, very suspicious. We may point out as we like that our prices for gas have not increased to the same extent as other commodities, and that the price of coal is the ruling factor; but no amount of talk will convince him so well as a reduction in the price of gas. He, unfortunately, has passed through a war experience, which is not likely to prejudice him in our favour. Poor supplies of coal have meant poor qualities of gas, difference and variation in qualities, and also, too often for many of us, have we been compelled to cut down the pressure to husband our slender resources. So that all round that confidence we were beginning to receive just before the war, and the great strides in progress we all saw before us then, have not materialized, and we have to begin afresh nursing our consumers, and, by efficient service, try to win back his old-time confidence. In himself, too, he has changed wonderfully. His foreign travels and the social unrest have made him critical and hard to please, and there is no doubt our sales department have a task before them that will require all their tact. We shall be compelled I am afraid to commence simple hire with gas apparatus again, and demonstrations and exhibitions, and in every way encourage him to start again and use gas. Our constant cry during the war to economize and use less gas has bitten deep in a good many minds; and we must cry out equally loud gas for all purposes if we intend to expand our business.

In conclusion, I would like to plead for a very careful and judicious examination of the many new features now being introduced. Remember that a good many of our appliances, crude though they may seem, are the results of a decade's survival of the fittest, and that we should be quite sure of our policy before we embark on it, at the same time ever lending an open mind to all things new, only accepting them after a due working trial. Once assured of our line of conduct. we should press on, and put our house in order for the great boom which I am optimistic enough to believe is coming. By at all times being willing to encourage our consumers with service and practical help, I feel sure that the volume of business which has been done in the past with gas for cooking and heating will be dwarfed into insignificance by the sales in the future.

THE GAS INDUSTRY AND ITS HANDICAPS.

[From an Address by Mr. J. W. M'Lusky, Engineer of the Glasgow Corporation Gas Department, to the Scottish Junior Gas Association (Eastern District) on July 23.]

What is given here is the second portion of Mr. M'Lusky's address, the first part of which was devoted to a consideration of the position of juniors in the industry, and the offering of some excellent advice. Then, having considered the personal side, he invited his audience, with the following remarks, to look briefly at the industry.

Since the end of hostilities, the journey has been a rough one for many undertakings, and the handicaps against satisfactory results have been many and varied. No doubt, war-time experiences accounted for many of them, while others are old enemies. Briefly, the chief handicaps might be classed as follows:

(1) Inadequate manufacturing plant.
(2) Allocation of unsuitable and grossly inferior coal.
(3) Defective and small service-pipes.
(4) Inefficient private gas appliances.

INADEQUATE MANUFACTURING PLANT.

It should be a cardinal law in gas-works practice that the productive capacity has an ample safety margin beyond any possible development on the sales side of the business. During the war, needless to say, works extensions were almost impossible; and since the armistice difficulties have been accentuated because of the slow delivery of castings and materials for structural work of all kinds. Perhaps the most disturbing factor during the recent reactionary period was the ill-conceived idea (among certain sections of industry) of the nation's wealth. The most casual student of finance and economics was bound to foresee two years ago what is now actually happening.

As employers, gas undertakings have always enjoyed the reputation of paying a fair day's wage for a fair day's work; but this has not prevented us from becoming the direct victims of outside disputes. Who could estimate, for example, the ramifications of the evil influences of the moulders' strike on the gas industry alone? But this trouble might have been avoided by a better understanding between capital and labour, and a generous infusion of the spirit of goodwill.

I have read somewhere recently that this is the greatest need of our times. It is referred to as the master key which fits every lock. We have had some experience in recent years of locks and deadlocks—certainly quite dead to the knowledge that anywhere there existed a key to fit them. Probably the lost key was the spirit of goodwill.

ALLOCATION OF UNSUITABLE AND GROSSLY INFERIOR COAL.

We hope this nightmare has passed into oblivion.

DEFECTIVE AND SMALL SERVICE-PIPES.

This is an all too common complaint. One cannot help feeling that, in the past, responsible officials in many undertakings were so eager to sell cheap gas that the distribution work was frequently undersized. This criticism is applicable to so many cities and towns in various parts of the kingdom that one feels bound to warn the gas engineer who neglects the distribution side in order to reduce the price of gas by a few coppers, that he is piling-up a heap of trouble, if not for himself, then for others.

The problem has certainly not been tackled in proportion to the rapid development of gas sold per service-pipe, with the result that, despite the heaviest available initial pressures, service-pipes

are now inadequate. The worst feature of this handicap is the fact that many consumers are willing to use more gas, which unfortunately is not there.

The tenement system of living is very prevalent in Scotland; and here we find vertical service-pipes originally designed for a lighting supply to six or more houses now expected to carry a supply for lighting, heating, and cooking. In such circumstances, the tenant naturally complains of bad gas. He is told by the gas department's employees that unless the property is more adequately "piped," a satisfactory supply is impossible. He seldom, if ever, succeeds in getting the proprietors to do anything.

Owners of property have made so little out of their investment of late years that they are not prepared to help in the slightest. This is a big question at present under consideration in Glasgow; but I am not in a position to define a policy to-day. Probably at an early date the question will become important enough to demand a conference of the industry in Scotland to define a policy and a remedy.

Inefficient Private Gas Appliances.

The trouble does not end with the small-sized service. We have the small internal pipes, and the cheap and inefficient private appliances and lighting fittings, to contend with. This is the strongest possible argument for a proper system of maintenance and free advice regarding choice of fittings. Progressive companies have been doing this work for many years; but it has evidently been a matter of the greatest difficulty to introduce the system in corporation undertakings.

Perhaps the chief reason for the long delay in starting such a system has been the strong opposition of the master plumbers. They naturally resist vigorously any attempt on the part of municipal gas undertakings to touch incandescent business; and the fact should not be lost sight of that this represents a very large proportion of our sales. It should not, however, be beyond the combined wit of the gas industry and the master plumbers to formulate a scheme whereby no one would lose business or money, and the consumer would receive better service. Here is also a matter which demands united attention and action.

Another difficulty about a municipal maintenance scheme would be the method of charging for the work done. A rate per burner for all who care to avail themselves of the advantage of maintenance is, perhaps, the best known and most satisfactory method; but, to reach all consumers, the alternative would be to cover the cost in the price of gas. One thing is certain—the satisfactory service we are anxious to give will never be accomplished until such a scheme is in full working order.

To illustrate how important the matter is, I would call your attention to statistics from certain Scottish municipal gas undertakings. You will probably be impressed with the fact that the consumption of gas in those undertakings for purely industrial purposes is not more than 14 p.ct. of the total; and of the remaining 86 p.ct. probably there are not more than 10 p.ct. without gas appliances, large or small. In Glasgow, 88 p.ct. of our consumers are provided with domestic gas appliances. In view of these statistics, one is bound to admit that, even allowing for considerable development in the use of gas for industrial purposes, the backbone of our sales department is the domestic consumer—notwithstanding the fact that many of them take less than the amount we consider the minimum from a commercial point of view.

While on the subject of gas sold per consumer, the undernoted statement, taken from the Glasgow records, shows the classification of sales according to the amount consumed:

Classification of Sale of Gas in Glasgow according to Consumption.

	Per Cent.
Under 10,000 c.ft.	20·46
Over 10,000 ,, and under 20,000 c.ft.	41·41
,, 20,000 ,, ,, 30,000 ,,	21·79
,, 30,000 ,, ,, 40,000 ,,	8·17
,, 40,000 ,, ,, 50,000 ,,	3·26
,, 50,000 ,,	4·91
	100·00

This scale was considered recently with other statistics by the Glasgow Gas Committee, when discussing the price of gas for the coming financial year, and resulted in the approval of a sliding-scale for domestic consumers as undernoted.

New Sliding-Scale of Charges for Domestic Consumers.

	Per 1000 C.Ft. s.	d.
Quantities up to 10,000 c.ft.	4	7
For the excess beyond 10,000 c.ft. up to 20,000 c.ft.	4	6
,, ,, 20,000 ,, ,, 30,000 ,,	4	5
,, ,, 30,000 ,, ,, 40,000 ,,	4	4
,, ,, 40,000 ,, ,, 50,000 ,,	4	3
,, ,, 50,000 ,,	4	2

At first glance, one might gather the impression that consumers in small houses were to be penalized by the fact that they would not participate in any financial advantage; but an examination of the department's records reveals the fact that we have many substantial gas accounts in quite small houses, while in some large residences gas is only used as an occasional convenience. The principle underlying the scale is obviously to encourage the consumer who already has appliances to make good use of them.

Alternative Method to the Foregoing in Operation in Halifax.

Standard volume of gas for lighting calculated on size of house, and charged at standard price. All gas consumed in excess of standard volume is sold at the non-lighting scale of charges.

Though this method involves a very considerable amount of initial labour, it is certainly a commercially sound and scientific proposition, and may yet be adopted in Glasgow.

Advice to Distribution Staff.

I will conclude with a word or two to the men on the distribution staff—the men in the "firing line," who are frequently caught in the "barrage" intended for the chief official and his committee.

You need not seek for worries; for they come out to meet you at every turn. But remember there are others in the industry with worries. Do not disparage the difficulties of sending out a dead straight line on the C.V. recorders, nor yet the difficulties of guaranteeing a line on the pressure recorders which has neither peaks nor dips. These little things are sent to try us, and, incidentally, the consumers; but we are nevertheless gradually coming to a better time, when such handicaps as those referred to will be eliminated.

I would suggest to the man who is frequently on interview work that he should be careful not to promise what he cannot fulfil. This applies to gas supply, and also to the anticipated gas bill after the appliance has been in full use. Most consumers have good memories; and those who have not err on the side favourable to themselves (virtue's side), and needless correspondence is frequently the result.

I would further suggest that the man who estimates should not forecast verbally unless compelled to; and in that case he should be above rather than below. Tell a consumer a job will cost about 25s., and there will be a row if it is 28s. 6d., even though you explain about that bit of sheet iron or those little brass unions. It is far better to say 30s., and give the consumer the benefit of the odd 1s. 6d. Be as good natured as possible with consumers. Remember how we aggravate them at times. Do not shout at them on the telephone; they will be far more impressed if you are polite and sympathetic. When you meet them in their own homes, and you hear their wonderful descriptions of the stuff they are expected to consume, let your trained intelligence restrain your language, so that the lady next door, who frequently overhears, will be puzzled to know the difference between the minister, the doctor, and the gas department's representative.

Now, gentlemen, my desire to drive home a few trenchant truths, in all sincerity of purpose, is gratified; and if any of you are helped along the road, then it was well worth my while coming here to-day. My object was to avoid technical matters, with which many of you, at any rate, are spoon fed. I have a very warm side for the juniors; and it is my earnest hope that both Scottish Districts will go on from strength to strength, and fill the vacancies as they occur with men who will ably carry on the traditions of an industry more than ever determined to render an economical and efficient service to the public.

Proposed Private Wagon Repairs and Maintenance Association.

Readers may be interested to know that a meeting of private wagon owners will be held on Monday, Aug. 8, at the Cannon Street Hotel, E.C., at 4 o'clock in the afternoon, to consider the desirability of forming a Private Wagon Repairs and Maintenance Association. All private wagon owners are invited to attend, when the scheme will be outlined; and the need for such an Association, its effect, aims, and scope, will be fully dealt with and explained. Promises actively to support the scheme have already been received from many of the largest owners of private wagons in Great Britain. The meeting is called by Mr. George Rose, who is taking an active interest in the matter.

Electrostatic Blast-Furnace Gas Cleaning.—Messrs. E. & A. Bury, O. Ollander, and F. Bainbridge, in a paper read before the Cleveland Institution of Engineers, referred to the Lodge and Cottrell electrostatic methods of gas cleaning. Both employ identically the same principle; the main difference between the two systems being in the manner in which the electrostatic discharge is generated, and then applied to the gas stream. Brief particulars of the Cottrell system in America were given in the "JOURNAL" for June 15 [p. 627]. In the case of the Lodge process, which is in operation at Skinningrove, the discharge is generated by means of a static transformer of the induction coil type; selective devices being employed for rectifying the discharge, so that it is uni-directional. Only the most intense portion of the discharge is employed. The apparatus is very light in character; and one of the features of the system is that practically standard units are used, the number of which vary with the type and quantity of gas to be treated. The discharge electrodes in the gas stream comprise vertical steel plates about 18 in. wide and 10 ft. long. These plates are placed edgewise to the flow of the gas in staggered rows, and stand on a grid of light sections which are earthed. They are built to form a unit of 85 plates. Suspended between them from insulators in the roof are vertical steel tubes provided with discharge points on either side of one diameter, and pointing to the steel receiving electrodes immediately opposite, on which the dust is deposited. The dust is removed by cutting-off the gas flow and striking with hammers the grids supporting the plates, and, in the case of the discharge tubes, the frame from which they are suspended.

GAS QUALITY AND LIGHTING EFFICIENCY.

Among the abstracts in the current issue of the "Journal of the Society of Chemical Industry" is one by "J. S. G. T." of a series of articles by Herren E. Terres and H. Straube, in "Gas und Wasserfach," on gas quality and lighting efficiency.

The abstractor says an investigation was made of the lighting efficiencies of upright and inverted mantles used in conjunction with straight coal gas and mixtures of coal gas with 10, 20, 30, and 40 p.ct. of water gas, producer gas, gas derived from the treatment of lignite, waste gases constituted of 20 p.ct. of CO_2 and 80 p.ct. of N_2, and mixtures of coal gas with air at pressures of 30, 40, 50, and 60 mm. water column. Details of the composition of the various gases employed are given and particulars of the specific gravity and the degree of primary aëration effected. A detailed examination was made of the degree of primary aëration as affected by the specific gravity of the gas and the supply pressure employed. Curves were given showing how the mean horizontal candle power of the upright burner depends upon the degree of primary aëration in the case of the various samples of gas employed. The principal conclusions were as follows.

In general, in the case of the upright burner the lighting efficiency is reduced by the admixture of other gases with straight coal gas. Making the comparison on the basis of equal additions of diluent gas, water gas is the best, followed by gas derived from lignite, so far as effect upon the lighting efficiency of the upright burner is concerned. The carbon dioxide content of the gas exercises more influence upon the lighting efficiency than does nitrogen; and in specifying the permissible degree of dilution of straight coal gas with gases of lower calorific power, it is important that the maximum permissible percentage of carbon dioxide should be stated. In the case of the inverted burner, the lighting efficiency depends principally upon the degree of primary aëration effected by the burner. Alterations of gas quality are of only secondary importance so far as lighting by the inverted burner is concerned.

Contrary to what is experienced in the case of admixtures of other diluting gases, with water gas the candle power increases in proportion as the percentage admixture of water gas increases, the same degree of primary aëration being pre-supposed in each case. So far as absolute candle power is concerned, the inverted burner showed much less change over the range of gases and pressures employed than did the upright burner. According to the degree of primary aëration effected and the gas pressure employed, the candle power varied between the limits 60 to 110 Hefner candles. The results obtained are interpreted in terms of the respective flame volumes as compared with the size of the mantle; and it is concluded that the degree of primary aëration is the criterion upon which depends the efficiency in use of gases within the limits of calorific values investigated (3400 to 5500 calories per cubic metre).

Flame temperatures alter so very little from one gas to another that they are of small consequence. It is the flame volume, dependent on the degree of primary aëration, which determines the lighting efficiency of a gas mixture.

The Aerial Derby and Benzole.—The "Petroleum News" says the enthusiasts of benzole will be gratified to learn that benzole scored a distinct success last Saturday week in connection with the Aerial Derby, for the race was won upon a mixture of motor spirit and benzole. Our contemporary adds: "This important success lends considerable weight to the popular belief that an admixture of about 20 p.ct. benzole with motor spirit tends to increase the efficiency of the internal-combustion engine. When one considers the phenomenal speed obtained by the fastest aeroplane in the Aerial Derby, the tip given above should certainly be worth following by motorists generally."

The Report on Sale and Hire of Gas Apparatus.—The Wandsworth, Wimbledon, and Epsom District Gas Company have replied as anticipated to the question of the Wandsworth Borough Council (arising out of the recent Profiteering Acts report on the sale and hire of gas apparatus), as to "whether they proposed to take any steps to re-imburse the excess charges which, owing to a misapprehension, were imposed upon a large number of consumers." At the last meeting of the Council, it was announced that a reply had been received from the Company. They do not agree with the conclusions of the Profiteering Committee, and do not intend to take any such action as the Council suggested. At the next meeting of the General Purposes Committee the matter is to be again considered.

Gas on a Wandsworth Housing Estate.—The Housing Committee of the Wandsworth Borough Council report that the Ministry of Health have agreed to arrangements being made with the Wandsworth, Wimbledon, and Epsom District Gas Company for the installation of gas to the whole of the houses erected on the Magdalen Park Estate under the Council's housing scheme, upon the following terms: (1) A sum of £9 per house to be paid to the Company in respect of houses distant more than 25 yards from existing gas-mains, and £5 per house within the said distance of an existing main, for carcassing to not less than nine points per house, laying the necessary service-pipes, extending mains, and executing all the works necessary to afford a supply of gas. (2) The above-mentioned sums to be based on a present-day estimate of the cost of service-pipes and carcassing, and to be varied *pro ratâ* with rises or falls in the costs of labour and materials. They are contributions towards the service pipes and internal work, and payments to be made when the work for each house is completed. (3) The sums of £9 and £5 to be reduced by sums already paid to the Company by the contractor.

CORRESPONDENCE.

[*We are not responsible for opinions expressed by Correspondents.*]

"Field's Analysis."

SIR,—The letters from our genial *doyen* in the issue of the "JOURNAL" for the 13th inst. derive their main interest from the stress they lay upon what should be the post-war policy of the industry. I should be inclined to put in the forefront of this the necessity for getting to closer quarters with the consumers' requirements, and their satisfaction at reasonable prices.

In common with the country generally—from the Government downwards—the gas industry has been living lately in something like a fool's paradise, forgetful perhaps of the fact that, during most of the years following 1914, the public have had to put up with a considerable amount of hard usage. Moreover, fictitious ideas were rife as to the value of tar and ammoniacal products, which have since been somewhat rudely dispelled. We owe most to our gas consumers; and they are certainly entitled to our first consideration.

I am not quite clear whether I understand my friend aright in his reference to "Field's Analysis." For some years past, the bulk of its contents—though worked out to one or two places of decimals—has been valueless for purposes of comparison (at any rate in the case of the Metropolitan Companies), without first correcting most items for the variation of calorific value. I am not blaming Mr. Ibbs for this, as he could but make the best of the information at his disposal. But I hope he will not succumb to any temptation to deviate from the only accurate path in future issues; and that he will take as his standard of comparison the declared therm values. "Ibbs's Analysis of Therm Costs, Prices, and Yields"—let us say "Ibbs's Analysis" for short—will then become for its present and future users an even more valuable and necessary compilation than "Field" has been in the past, and which it will have so admirably replaced. CHARLES CARPENTER.

South Metropolitan Gas Company, June 25, 1921.

Further Notes on Amalgamation Policy.

SIR,—Not merely to those smaller and less "superiorly" equipped will amalgamation do good, but also to the larger undertakings. The strong will be the stronger. Unity gives further strength. Think of the limitation legal and physical to the largest of us (which is to "speak with the enemy at the gate"), who can best buy coals, handle manufactures, and develop residuals, or deal with contracts, public bodies, legal and insurance matters.

Where is the most important concern which has not on its fringe the distributing terminals or index of vacant areas which the smaller concern cannot economically reach? What extensions can be faced to-day at the cruel prices asked? Where is the cheap possibility of getting mains or laying them, much less repairing the roads with the sort of labour and materials the local authorities obtain, and re-exact from us?

The position is very serious everywhere. It is useless to deny it, though interested parties will always be found to prefer isolation.

There need be no alarm as to honest claims for displaced officers and directors. The precedents by parliamentary sanction are just—even liberal; and why fifty people should go on administering what eight or ten might do better by concentration, is past comprehension. Old officers naturally should get comfortable retirement. Young ones can get larger scope and further advancement. Anything less would be unfair to both; but conspiracies to mislead and badly advise ignorant shareholders would be nothing less than contemptible profiteering.

But combining statutory companies admits of no trafficking for special profits to those combined. The Acts are distinctly parliamentary contracts between the consumers and the undertakings which must be carried out on the standards and in the areas covered, and without any bonuses or special advantages to any shareholders or directors.

The improvements of economy in working must be shared—the larger part to the consumer, and only the smaller part to the shareholder. There is no room for either blundering or plundering—such as wrecked a recent suggestion of my own to the perpetual injury of the shareholders, who were led to expect more than the advantage necessarily arising from cheaper production.

The way is made easier and less expensive under the Gas Regulation Act, which almost encourages us to get together.

Not the smallest undertaking should be left out nor mere remoteness be a disqualification; for their terms will generally be found to be much more profitable under joint administration than if left divided. The larger partners should wisely be liberal and broad-minded to their weaker brethren, rather than leave them out in the cold when they can always bring profit to the larger partners. If this may be thought dogmatism, it is truthfully experienced in practice and an experience embracing numerous instances of both scales.

The subject is by no means exhausted; and I hope for the chance of meeting honest criticism. HY. E. JONES.

13, *Queen Anne's Gate, S.W., July 25, 1921.*

Cement Joints for Cast-Iron Mains.

SIR,—On p. 684 of your issue for June 22, you give an abstract of a recent paper read before the Natural Gas Association. The abstract contains this quotation from the paper: "It has been concluded, however—based upon the results of special leakage investigations in both artificial and natural gas distributing systems—that the use of cement joints in cast-iron mains was not justified by the service which has been secured."

It may interest your readers to know that this statement is entirely at variance with the experience and opinion of a majority of the distribution engineers in this country. A similar statement was refused publication in a paper presented to the recent meeting of the American

Gas Association; and steps have been taken in this country to answer the statement as given before the Natural Gas Association.

The cement joint for the small sizes of cast-iron mains (the ones referred to in this paper) has never been in higher favour in this country than to-day; and this year a number of 16 in. and 20 in. lines are being laid with cement joints, used in a specially designed bell which has been adopted as a standard for cement joints by the American Gas Association.

WALTON FORSTALL,
Chairman, Committee on Cast-Iron Pipe Standards, American Gas Association.

United Gas Improvement Company,
Philadelphia Gas-Works, July 8, 1921.

Purification by Oxide of Iron.

SIR,—In the introduction to Mr. Linder's work on catalysts, as given in the "JOURNAL" of July 20, p. 162, there is a misprint to which, I think, attention should be drawn.

Referring to the contact mass in oleum plants, it is stated that "the maximum weight of platinum with maximum surface is presented to the gases on a carrier of relatively preponderant mass." It should read "the minimum weight of platinum with maximum surface," &c.

T. LEWIS BAILEY.

Cornwall House, Stamford Street, S.E. 1,
July 22, 1921.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for July 20]

Nos. 18,671 to 19,272.

ADAM, W. G.—"Manufacture of sulphate of ammonia." No. 19,217.
ALEXANDER, W.—"Gas-meters." No. 19,092.
BARNETT, G. F.—"Gas-burners." No. 19,146.
BARRALET, J. H.—"Geysers, &c." No. 19,264.
BOOTE, LTD., T. & R.—"Hearth fire for coal, gas, &c." No. 18,692.
COKE-OVEN CONSTRUCTION COMPANY, LTD.—"Manufacture of neutral ammonium sulphate." No. 19,220.
COOPER, C.—See Adam. No. 19,217.
DOREY, W. A.—"Indirect lighting unit." No. 18,999.
FLETCHER, RUSSELL, & CO., LTD.—"Back-plates for gas stoves." No. 19,205.
FLETCHER, RUSSELL, & CO., LTD—"Oven doors." No. 19,206.
HOLMES & CO., LTD, W. C.—See Adam. No. 19,217.
JEFFREY, J. G. M.—See Boote. No. 18,692.
LENTZ, H.—"Oven for semi-coking of fuels." No. 19,158.
LUCAS, F. L.—"Mixers and burners for air and gas, or air and hydrocarbon vapour." No. 19,236.
MACLAREN, A. F.—"Utilization of wet carbonaceous material." No. 18,837.
MARR, J.—See Coke-Oven Company. No. 19,220.
MILLS, J. W.—See Fletcher. Nos. 19,205, 19,206.
NEW GEYSERS, LTD.—See Barralet. No. 19,264.
PEASE, E. L.—"Treatment of carbonaceous, &c., materials for utilization of nitrogen therein." No. 18,865.
PINCHBECK, LTD.—See Alexander. No. 19,092.
STEPHENS, A. J.—See Dorey. No. 18,999.
WILTON, N. & T. O.—"De-emulsifying crude oil, tar, &c." No. 19,088.
WINKELMÜLLER, F., J., K., & M.—"Tightening flanges, provided with a collar, on pipes." No. 19,246.

Glastonbury Gas Department and the Strike.—Submitting to the Glastonbury Borough Council the report of the Gas Committee, Major Bath pointed out that, in spite of the difficulties they had gone through during last year, they had only made a loss of something like £250, and the accounts had worked-out in a wonderful way; for Mr. D. E. Garlick (the Manager) estimated in September that the loss would be more than this. He wished to propose a hearty vote of thanks to Mr. Garlick for the way he had carried-on under exceptional difficulties. The Council and the ratepayers were deeply indebted to Mr. Garlick, for it was really wonderful how he had kept them going for over thirteen weeks. The present strike had cost them in the increased price of coal about £750, and loss in residuals of something like £400; so that altogether the strike would have cost the people of Glastonbury something over £1100. He knew it would be unpopular; but he would like to see this loss met out of the current rates, because it would bring it home to the strikers. Alderman Stead, in seconding, endorsed the remarks of Major Bath with regard to the work of Mr. Garlick. The motion was carried.

Woodall-Duckham Verticals for Hinckley.—It was reported to the Hinckley Urban District Council that five tenders had been received for the erection of vertical retorts at the gas-works; and the Gas Committee, after an inspection of the various systems in different towns in the Midlands, recommended that the tender of the Woodall-Duckham Company, Ltd., to erect twelve retorts (to deal with 60 tons of coal per day) be accepted—the tender being subject to any rise or fall there might be in the price of labour and materials during the construction of the work. The Committee further recommended that application be made to the Ministry of Health for their sanction to a loan of £45,000, and that the Board of Trade be asked for an Order authorizing the construction of the retorts upon land belonging to the Council, which was not scheduled for gas manufacturing purposes in the Hinckley Local Board Gas Act, 1880. Mr. W. H. Bott (Chairman of the Committee) said he thought they were perfectly justified in their recommendations, because at the present time the works were really turning-out gas in excess of their capacity. As a business proposition the new retorts would be a step in the right direction. They would be more economical in every way, and would produce much more gas per ton of coal than under the present system. The recommendations were approved, and the tender accepted.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Progress of Bills.

The Colne Corporation Bill: Read the third time, with the amendments; further amendments made; passed; and returned to the Commons.

The Swansea Gas Bill: Read the third time, with the amendments; passed; and returned to the Commons.

The Wandsworth, Wimbledon, and Epsom District Gas Bill and the Nelson Corporation Bill: Returned from the Commons, agreed to, with amendments, which were considered and agreed to.

The Paisley Gas Provisional Order Bill: Brought from the Commons; read the first time; and (pursuant to the Private Legislation Procedure [Scotland] Act, 1899) deemed to have been read a second time, and reported from the Committee.

The Harrogate Gas Bill: Returned from the Commons, with the amendments, agreed to.

HOUSE OF COMMONS.

Progress of Bills.

The Paisley Gas Provisional Order Bill: Considered; read the third time, and passed.

Nelson Corporation Bill: Read the third time and passed, with amendments.

The Harrogate Gas Bill and Swansea Gas Bill: Lords amendments considered, and agreed to.

Monazite Sand.

Mr. ARMITAGE asked the President of the Board of Trade what arrangements had been made so that adequate supplies of monazite sand at reasonable prices were available to British manufacturers.

Mr. BALDWIN replied that certain British manufacturers were directly associated with companies owning deposits of monazite sand. In addition, the Travancore Minerals Company were bound by the terms of their concession to sell monazite sand direct, and at a fair price, to any *bona fide* British firm desiring to purchase the material in reasonable quantities.

Financial Hardships Applications and Hire Charges.

Mr. LUNN asked the President of the Board of Trade whether he could give information as to the number of gas undertakings in the year 1920 which charged no hire for gas cookers, meters, and fires; and the number of applications to, and the number granted by, the Board of Trade for each year since the operation of the Statutory Undertakings (Temporary Increase of Charges) Act, 1918, for power to increase the price of gas.

Mr. BALDWIN replied that he was unable to state the number of gas undertakings which, in the year 1920, made no charge for the hire of gas cookers, meters, and fires. The number of applications made by gas undertakings under the Statutory Undertakings (Temporary Increase of Charges) Act, 1918, and the number granted in each year were as follows:

	Number of Applications.	Number Granted.
1918	68	45
1919	155	144
1920	166	162
1921 (to July 20)	50	57
Total	439	408

BURNLEY CORPORATION BILL.

This Bill was last week considered by a Committee of the House of Lords, presided over by the Marquis of Bath. As stated when the Bill was before the other House [see "JOURNAL" for April 27, p. 207], there is only one clause affecting the gas undertaking, which deals with the provision of offices, show-rooms, &c.; and there is no amendment.

BATLEY CORPORATION BILL.

The House of Lords Committee, presided over by the Marquis of Bath last week, ordered this Bill to be reported for third reading. A section of the Bill deals with the gas undertaking, and contains a number of clauses of a domestic nature. The proceedings in the House of Commons were reported in the "JOURNAL" for June 8, p. 560, and no material amendments have been made since.

Wandsworth Gas Company's Charge.—The Directors of the Wandsworth, Wimbledon, and Epsom District Gas Company have intimated with very much regret that, as from the present quarterly taking of the indices, they must increase the price of gas by 2d. per therm to all consumers. They explain that the increase is entirely due to the very heavy loss incurred by the Company through meeting the long-continued coal dispute, which exhausted the stocks and rendered necessary the importation of coal, which could not be obtained except at the most exaggerated price and of the most inferior description. It is hoped that the increase will be only temporary; and the consumers are assured that the price will be reduced as soon as practicable. The great demand for gas shows the urgent need of fuel of some sort; otherwise the Directors would have considered the alternative of the temporary shutting-down of the gas-works.

LEGAL INTELLIGENCE.

COAL DUST NUISANCE FROM GAS-WORKS.

Action against the Commercial Gas Company.

The action of *Tree v. The Commercial Gas Company*, which was tried before Mr. Justice SHEARMAN in the High Court on the 20th, 21st, and 22nd inst., was brought to recover damages for injuries sustained by plaintiff to his house, furniture, provisions, and other property caused by coal dust alleged to have come from defendants' gas-works and coal conveyor, and for loss of custom and injury to the goodwill to h's business as a coffee shop proprietor.

Mr. PATRICK HASTINGS, K.C., and Mr. BENNETT appeared for the plaintiff. Mr. STUART BEVAN, K.C., and Mr. BUCHANAN represented the defendants.

The plaintiff, Arthur Albert Tree, is the tenant of a coffee shop at No. 86, Wapping Wall, and defendants are a statutory Company incorporated by the Commercial Gas Act of 1847, whose works are situate on the opposite side of the road to plaintiff's premises. For some time past, the defendants had landed coal by means of a conveyor at their works; and the plaintiff alleged that ever since they had erected and commenced to use the conveyor they had discharged into the air large quantities of coal dust, which penetrated into his premises and caused a serious nuisance. Ever since 1912 plaintiff and other residents in the neighbourhood had made repeated complaints, but, as was alleged, without anything being done to remedy the nuisance.

Defendants denied committing any nuisance, and said that in the terms of the Act they were under heavy penalties to supply gas of a certain quality and purity, and by reason of the necessary handling and moving of coal from the wharf to the furnace and by the manufacture into gas a certain amount of coal dust must necessarily be discharged into the air. They further said that their plant, including the conveyor, was the most scientific and best adapted for the purpose. It was widely used throughout the country, and caused the least possible amount of coal dust to be discharged. They also pleaded that they had taken all reasonable precautions to reduce the amount of dust and to mitigate any annoyance that might have been caused thereby; the conveyor and the whole of the plant having been completely enclosed by a corrugated iron roof and boarding at the sides, and the coal was regularly sprayed with water before being handled.

Plaintiff gave evidence in support of his case, and said he had lost a great deal of custom through his goods and utensils being covered with dust, in addition to which his furniture had been injured.

Ernest Jackson, a grocer and provision merchant, said that all the goods in his shop were smothered with coal dust, and he could not expose butter or margarine in the shop. The dust came from defendant's works.

Mr. *Lynch*, a publican, gave similar evidence, and said he could not use ordinary water jugs. Although he used glass bottles, the water in them had to be constantly changed. When the wind was from the south-west he had continually to wash down the bar, and had occasionally to clean out the gutters, which became choked with coal dust. He was positive that the dust came from the conveyor.

T. Turinder, a coffee shop proprietor in Gravel Lane, said he had continually to wipe the tables. Plates and cups washed overnight were covered with dust by the morning. He had complained several times to the Company without any result. On account of the nuisance he had to move away. Last Good Friday, when a boat was emptying, his shop was absolutely covered with dust which came from the direction of the river. When the grab which brought up the coal from the ship was opened to let the coal fall into the hopper, a cloud of dust ascended.

John Pole, who was in the habit of having his meals at plaintiff's shop, said he had seen the dust gradually settling on the dinner plates. When the grab dropped the coal, the dust rose in a cloud. The dust was not so bad before the conveyor was erected. He knew many customers who had given up going to plaintiff's shop on account of the dust.

Herbert Hogg, managing clerk to plaintiff's solicitor, said when he went to the premises he saw a cloud of dust coming from the door of the hopper. At this time a ship was not being unloaded. He had seen the grab working, and when it opened a cloud of dust ascended. He produced several samples of the dust which he collected from different parts of the premises. He had never seen in any other place anything which could be compared with this.

Patrick Donovan, a member of the Stepney Board of Guardians, said he recollected the works before the conveyor was erected. Since its erection, it had been a curse to the children and the whole of the neighbourhood, as the dust spoilt clothing and prevented people from opening the windows. On Saturday last, the fall of dust reminded him of a fall of snow, except for the difference in colour. He had been in communication with the Borough Council upon the matter. The dust came from every part of the conveyor.

J. T. Curry said the state of things in 1912 was not so bad as at the present time. The dust came from the conveyor.

Herbert Hawley, Public Analyst of the Borough of Stepney, who had analyzed samples of the dust collected at the New Crane wharf, from the roof of plaintiff's premises, from the gutter of Middleton's wharf, and from Hilliard's Court, said sample No. 1 contained unconsumed coal dust, sample No. 2 also contained coal dust, and No. 3 and No. 4 contained very little coal dust.

In cross-examination, witness said the coke breeze must have come from some chimney; but he should not expect to find this on the roof. As he had only made an informal examination, he could not positively say whether it was ashes or dust.

R. W. Bowman, a builder, who had given an estimate for repairing the outside of plaintiff's premises, said he found the gutter filled up with coal dust, and two or three bushels were taken out which he produced, as well as a sample taken from New Crane wharf.

Many other residents in the immediate neighbourhood gave evidence of the nuisance; and this concluded the plaintiff's case.

Mr. STUART BEVAN said defendants did not claim that they had any statutory right to erect a conveyor or to commit a nuisance.

His LORDSHIP said there was really no legal point in issue.

Mr. STUART BEVAN agreed. He said as this was not a residential neighbourhood, he relied strongly upon the character of the place. Until 1912, defendants got their coal into the works from the river by means of cranes fixed on the jetty. The vessels came alongside, and the coal was got out by a grab from the hold and dropped into a hopper, from which it was discharged into open trucks. An elevated railway ran from the High Street into the works; and in discharging by a grab there was undoubtedly considerable risk of dust being discharged from the uncovered trucks into the air, so that it was decided to substitute a conveyor for the overhead rail. This system, so far as engineering skill could devise, was perfect, and the conveyor in question was one of the best type. The coal was carried on a band, which was enclosed, and discharged into a hopper, which was covered by a substantial roof. It was impossible to eliminate the chance of some dust occasionally escaping; but the hopper, which at one time had four windows, had now been entirely cased-in. Since 1912, this state of things had continued. When first erected, the conveyor was covered in at the top and sides, but not at the bottom, though recently bottom plates had been inserted. Their case was that since 1912 the condition of things had been considerably improved. When the doors in the conveyor were closed, it was absolutely impossible for dust to come out in clouds as witnesses had stated. His contention was that the whole of the mischief complained of was not caused by coal dust, but by cinders. He should call a number of witnesses from Middleton's wharf, which was close by, who would state that if the mischief was caused at the jetty, they would suffer more than any one else; whereas the fact was that, since 1912, the condition of affairs had enormously improved.

Dr. *Bernard Dyer* said he had examined many of the samples which had been produced in Court, and found they were composed substantially of cinder dust and sawdust. The cinders would be ejected from chimneys through forced draught. A microscopical examination showed that the particles had undergone fusion, and when converted into coke in a crucible the volatile matters were only 4 p.ct.; so that the unvolatilized coal matter was very little indeed. There might be a small quantity of coal dust in the samples; but the percentage was negligible. On June 18, he was handed a number of samples taken from plaintiffs' premises and other places. These he submitted to a microscopical examination, and found they consisted of ordinary dust, mortar dust, ashes, and fine cinders. He would not say there was not some coal dust; but he detected no unburnt coal. On July 2, he went to the gas-works and took some of the dust close to the discharge of the elevator, and on examination it proved to be raw coal. The coal then being used was Sarr coal, which contained only 21 p.ct. of volatile matter. He did not wish to be understood as saying that coal dust or cinder dust was a boon or blessing to anyone—he was merely saying what in his opinion the dust was which he examined. If there was a considerable quantity of coal dust flying about, there was great risk of explosion if naked lights were used, and there were lights in the store from which he took his samples.

In cross examination, he said coal dust was more dangerous in a closed place than in an open one, and therefore it was necessary to have ventilation. Being shown several samples of dust, witness said he could not be sure it was coal dust without making a microscopical examination.

His LORDSHIP said it appeared to him to be a mixture.

Cross-examination continued: He he had not seen the grab working, and therefore could not say whether coal dust was flying about—it would depend very much upon the wind. Fine dust would fly about quickly; while heavy dust would settle down at once.

Mr. *Stanley H. Jones*, the Engineer and General Manager of the Company, said that the coal had been discharged by a grab from 1901, but before that period it was done by means of tippling buckets. When he took over the Wapping works, new cranes were put in. The grab, which would lift about one ton at a time, swung round over a receiving hopper which discharged into trucks. The method of discharging was the same now as in 1902. The trucks carried about 16 or 17 cwt. at one time, and were propelled by man power on the railway. The coal in the trucks was pushed along the roadway and discharged into store by opening the bottom of the truck. The stores were roofed-over. From time to time they received complaints of dust—one being from Middleton's wharf. As a result, he had a wind sail stretched across. This wind sail was still in use. About half the coal received would be taken by barge or lorry to the Poplar works and the Stepney works. In 1912, an alteration in the process was made by the erection of the conveyor, though no alteration was made in the crane or the grab or the jetty hopper. When the conveyor was put up coal-breakers were installed on the jetty hopper which broke up the larger pieces of coal. About 50 p.ct. of the coal which passed through the machine had to be crushed. It then went on to the band, and was carried to the hopper. In passing from the grab to the mouth of the hopper, there was always a certain amount of dust given off, which he should describe as a puff, not a cloud. Steps were taken to ameliorate the mischief by spraying the coal in the ship with water. The band of the conveyor was covered with corrugated sheeting to prevent the wind blowing the light coal off the belt. He had often been on the jetty when coal was being discharged, but had not seen any escape of dust. The coal was shot down into covered shoots which led to the store, and the belt ran right into the store. The store was covered to prevent any chance of dust escaping into the air. He did not see how dust could possibly escape from the conveyor, as it was properly covered in. He had prepared tables showing the total amount of coal brought into store, the amount sent, and the consumption each year. Apart from the question of coal dust and cinders, the neighbourhood was not a clean one. Owing to the strike, they had had a consignment of foreign coal, which was quite unsuitable for gas making, as practically no gas or coke was obtained from it, and the residuum—viz., ashes—blew up the shaft. With the forced draught in use there would always be an escape of some ashes from the

chimney. During part of the control period, the Government insisted on their taking any coal that was handed to the vessel. From 1902 to 1915, the majority of the coal went by road wagons.

Cross-examined: Since 1912 there had been a number of complaints of coal dust.

Can you suggest what people were complaining of after 1912?—It is difficult to say; I think they disliked the appearance of the conveyor as it soared into the air.

You have no doubt they were frequently complaining about coal dust?—It was alleged to be coal dust; but I cannot admit it.

You know quite well that the local inhabitants are furious with the Company?—I have no knowledge of that.

Do you or not agree that there is a very considerable amount of coal dust blown about when there is a wind?—I would agree that a certain amount might be. I have frequently walked down Gravel Lane when the wind has blown in the direction of plaintiff's premises and have not noticed any dust.

Do you admit that there is in fact of necessity a considerable quantity of coal dust blowing from the gas-works?—Not now; putting the roof over the coal store has helped to stop it.

You have no doubt that on certain occasions a large quantity of coal dust is blown about?—When the coal ships are discharging.

If the grab takes up the coal and lifts it into the air, is it not inevitable that a certain amount of dust must escape?—A small amount may.

When the grab gets to the top it opens to enable the coal to fall into the hopper?—It has to be lowered some feet before it is opened; it is lowered to about 4 ft. above the hopper.

Have you the slightest doubt that the result of dropping a ton of coal into the hopper must be to cause some dust to escape?—There is some dust.

Is there anything to prevent the dust going up into the air?—No.

And the machine is working for twelve hours at a time?—Yes.

The dust produced by breaking-up the coal in the conveyor must be enormous?—Yes, in the case of Tyne coal, but it does not come out. A large quantity of coal goes to Stepney by motor lorry and by barge to Poplar. The barge draws up to the skip and the coal is shot down a shoot into it. The coal in the barge has all been through the crusher. Coal was shot loose into the lorry. This was done in the tunnel, the end of which was open to the works. The tunnel was open to the air almost immediately under the conveyor, and some dust might escape from there. On the river bank there was an open store, and coal was thrown off the conveyor by an open shoot into the store. In the open store 2000 tons could be kept. The shoot would be about 60 ft. above the store.

A photograph showing one of the openings open and the grab at work was handed to witness, who said he could not understand it at all. The conveyor was cleaned once a fortnight, and during the cleaning the man-holes were open. There was another store on the other side of the works. This was roofed-in. If the stores were well ventilated, there was no danger of the ignition of coal dust. He quite realized that the nature of the complaints was that when a ship was being discharged and the conveyor was working, dust escaped and entered the houses. He did not go to see into the complaints, but believed they were investigated by an official.

Dr. *Bernard Dyer* (recalled) said since last evening he had analyzed the sample of dust taken from the window of the public house, and found it to be a mixture of sand, dust, and coal dust, and there was a good deal of indeterminate matter. Looking at it from the defendants' point of view, there was at least 30 p.ct. of coal dust, and from the plaintiff's point of view 60 p.ct.

Mr. *Alwyne Meade*, the Manager of the Wapping Gas-Works, said that there had been no substantial alteration to the conveyor since 1916, but some alteration had been made to the coal stores. One had a heavy slate roof and brick sides, and the windows, which in 1916 were glazed, were now boarded up. The boards were never removed except repairs were being carried out. Although many conveyors were in use by gas companies, he had never seen one which was hermetically sealed except that at Wapping. When the coal left the grab for the hopper, there must be a certain amount of dust although the coal had been damped. He would not say there was no escape of dust from the conveyor, but the quantity was inappreciable. In the tunnel where the lorries were loaded, the gates were always closed immediately the wagon got inside. The complaints received were all of a very casual nature. He had never received a written complaint.

Cross-examined: Coal dust in a private house to excess would be a nuisance.

Is the dust sufficient, in your experience, to be a nuisance?—No; not in a neighbourhood of that character.

You have heard the witnesses say that when the conveyor was working clouds of dust arose and they had to shut the windows. Did you ever go and inquire into the complaints?—I went to Mr. Tree's and to Mr. Willett's.

Was a ship unloading and the conveyor working at the time?—Yes.

Was there any ground for the complaint?—I consider there was—it was a very dusty day.

Do you admit that on the day you went round to Mr. Tree's house he was being seriously inconvenienced by dust, part of which came from your works?—I admit he was being inconvenienced.

Where was the coal dust coming from?—I could not tell you.

His LORDSHIP: Was it blown from the jetty?

Witness: I really do not know. I should think that it came from the jetty.

Mr. *Wm. Doig Gibb* said he had inspected the works of defendants. On the occasion of his first visit, a ship was being discharged, and although water was being put on the coal in the grab a small cloud of dust was given off which did not spread far into the air. There was no escape of dust from the conveyor—not until the coal was just falling into the hopper. The conveyor was quite of a modern type, and extraordinary care had been taken about its erection. There was not the slightest indication of any coal dust escaping from it, or from the store, which was lighted by gas. No attempt had been made to ventilate the store. He did not see coal dust on the roof of defendants' works. On his second visit, he again inspected the conveyor, but saw no reason to change his opinion as to its efficiency.

His LORDSHIP: I rather gather from your description that the gas-works were as clean as a dairy.

Mr. *Edward Wm. Easton*, an auctioneer and surveyor, who had inspected plaintiff's premises, was called to speak to the small amount of damage done to the furniture.

Mr. *Fredk. J. Cook*, the chief foreman at the gas-works, said all complaints—which he believed only amounted to four in two years—had been thoroughly investigated.

Mr. *George Evetts* (Consulting Gas Engineer), who had examined a sample of dust said to have been taken from plaintiff's premises, gave it as his opinion that it was sand dust. In cross-examination, he said dust could be obviated by enclosing the apparatus used for moving the coal. There was no real reason why the cranes should not be worked under cover; but he would not recommend it.

A number of witnesses in the employ of the English and Scottish Co-Operative Society, which stores rice, butter, margarine, sugar, tea, and various other articles at Middleton's wharf, were called and testified that since the erection of the conveyor they had no reason to complain of coal dust.

Counsel having summed up, his Lordship said he would give judgment the following Monday.

JUDGMENT.

On the 25th, his LORDSHIP gave judgment. After stating the facts of the case, he said he had come to the conclusion that plaintiff had established his case. He was satisfied that the witnesses on both sides had endeavoured to tell the truth, and the real question to be decided was one of degree. That dust was emitted there could be no doubt, though he was satisfied the nuisance was not so bad now as it used to be. During the coal strike, the Company had had to work under abnormal conditions; and although they had tried to do the best they could with German coal, there was no doubt showers of dust had come from the chimneys. When the conveyor was installed, the nuisance was very great. He was much troubled in the early part of the case by the fact that the witnesses were unable to say with any certainty whence the dust came; but from the evidence given on behalf of defendants it was clear the dust came from the gas-works. No doubt things were improved by spraying the coal with water; but he thought the dust came from the grab and also when being shot into the barges. Unscreened coal was used; and when being crushed in the conveyor, dust was created which escaped through the crevices. The principle of law was plain that, even in a locality where a nuisance existed, one was not entitled to add a further nuisance. The Court was not asked to grant an injunction to restrain defendants from committing a nuisance, but merely to award damages in respect of damage done. Plaintiff had claimed for all sorts of damage to the house and to furniture—irrespective of the fact that in the neighbourhood a good deal of damage would have arisen even if the coal dust was not there. He thought justice would be done by awarding plaintiff £200 for personal damage and £50 for damage to the premises.

On payment of £50 to plaintiff and £200 into Court within 21 days, his Lordship granted a stay.

A Contract for the Sale of Pitch.

Mr. Justice Bailhache, sitting in the King's Bench Commercial Court, heard a claim by Messrs. Rose and Partners, Ltd., of Hull, against M. Manes Levy, of Paris, to recover £7161 damages for breach of contract for the sale by plaintiffs to defendant of 1000 tons of gas coal-tar pitch at 210s. per ton f.o.b. Thames. Plaintiffs said the defendant had failed to accept the goods, and admitted the breach of contract. The only question, therefore, was the amount of damages. For the defendant, it was contended that the damages payable should be in the neighbourhood of £2000. His Lordship said the plaintiffs were entitled to damages for all the deliveries except one which they had waived. The damages were to be ascertained at the price they could have obtained for the goods at the end of each month, when the defendant ought to have taken delivery, but completely failed to do so. There was no market for this coal-tar pitch in the ordinary sense of the word; but the plaintiffs had taken what seemed to him quite unusual efforts to find a purchaser when the goods were thrown back on their hands, and had done everything they could to dispose of them. The resale, however, had resulted in a heavy loss; and he awarded the plaintiffs £6207, with costs.

Development Scheme at Liskeard.—The Liskeard Gas Company, as the first step in extensions and replacements which they contemplate in securing an adequate supply of gas for the town, have commenced the erection of a new holder with a capacity of 32,000 c.ft. Their development scheme will involve an expenditure of some thousands of pounds.

Ammoniacal Liquor Contract at Leigh-on-Sea.—A communication has been considered by the Southend Corporation Gas Committee from the contractors for the purchase of the ammoniacal liquor produced at the Leigh-on-Sea Gas-Works, in regard to the terms upon which the liquor is to be removed by them during the period from May 31 last to Nov. 10 next—in view of the very unsatisfactory state of the market for sulphate of ammonia, upon the price of which is based, on a sliding-scale, the amount to be paid for the liquor. The contractors said they would continue to take the liquor according to the sliding-scale, which, when the value of sulphate falls to £15 per ton, brings the value of the liquor to *nil*, but that they were prepared to remove the liquor free of charge until sulphate dropped to £13 10s. per ton. They suggested that, when its value fell below this amount, the Corporation should pay to them for the removal of the liquor one-farthing per ounce per butt for each fall of 5s. or fraction thereof per ton in the value of sulphate. It was resolved to agree to this suggestion, upon the understanding that, as soon as possible after Nov. 10 next, they shall furnish to the Council a statement from the British Sulphate of Ammonia Federation showing the actual amounts realized by the sale of sulphate of ammonia during the period above referred to.

MISCELLANEOUS NEWS.

GAS REGULATION LEGISLATION IN FRANCE.

Debate in the French Chamber on the Fuel Question.

The issue of the "Journal Officiel" of June 22 last contained a verbatim report of a debate in the Chamber the previous day respecting the Bill for the regulation of the manufacture and supply of gas. The chief provisions of the Bill give the French Government power to enforce the recovery of certain bye-products by gas manufacturers and stipulate that the calorific value of the gas may not exceed 4700 cals. per cb.m., nor fall below 3500 cals.—the price varying with the calorific power. The Bill also limits the proportion of water gas, which may be added to coal gas, to 20 p.ct. As will be seen from the following abridged translation of the debate (the full report of which occupies twenty-eight pages of the "Journal Officiel"), the proposals of the Bill prompted a discussion greatly exceeding the limits of the specific subjects affected by it, and extending to a consideration of the whole fuel problem from the national standpoint.

The provisions of the Bill discussed by the Chamber were contained in the two following articles.

ARTICLE 1.—From the date of the promulgation of this Act, in any new contract relating to the manufacture, supply, or distribution of coal gas, the quality of the gas supplied or distributed shall be defined solely by its calorific power at constant pressure (water condensed)—that is to say, its gross calorific power—which shall not exceed 4500 calories (kilogramme degree) per cubic metre, measured dry at 0° C. and 766 mm. pressure of mercury.

ARTICLE 2.—When not contrary to the specifications of the quality of gas contained in their contracts or agreements, every person or body in charge of a works or coke-furnace shall, by order of the Minister of Public Works, or, in the case of an undertaking holding a concession for the public service, on notice by the Minister of the Interior, be compelled to extract from the gas supplied by him (or them) the various chemical substances or carburants contained in the gas and necessary for industrial use, consumption, or manufactures relating to national defence.

Both these articles underwent considerable amendment as a result of the debate.

M. EDOUARD BARTHE welcomed the measure as the starting-point of a French national policy in regard to fuels for internal combustion engines. It was the first time the Government had sought power to compel private undertakings to recover the materials for the purposes of national defence and industry. He emphasized the need of examining the fuel problem from every standpoint, in consequence of the difficulties in maintaining supplies of petroleum and coal, and referred particularly to the need of a supply of benzole for defensive and industrial use. Before the war they relied on the Germans for benzole; and the war had not witnessed a great development in the production of benzole in France. He quoted the figures for benzole production by various gas-works, coke-ovens, blast-furnaces, and metallurgical works, as further emphasis of the small scale of production. They included those for important undertakings—such as the gas-works of Paris and Lyons—and totalled 15,000 tonnes per annum. The powers provided by the Bill should, according to M. Charlot, furnish about 20,000 tonnes, or perhaps not quite so much. The production of benzole was, however, a much wider question. Coal was a material which did not yield the largest quantities of benzole—from 4 to 6 litres per tonne. But the lignites, possessed so abundantly by France, formed an important source for the extraction of benzole, and one which before the war the Germans exploited with success. In Germany 100 million tonnes of lignite were distilled, with extraction of benzole and other bye-products. After satisfying her own demands Germany exported the surplus of these products. Yet lignites in France were superior to those utilized in Germany; and there were immensly rich deposits in various parts. But in France the banks and public authorities had discouraged exactly those kinds of effort to utilize the national resources which in Germany were facilitated. At Boucau recently, a vertical continuous plant had been erected and had yielded excellent results in the distillation of lignite—viz., 25 litres of benzole per tonne (or 50 litres inclusive of other light oils suitable for motors), in addition to 25 kilos of sulphate of ammonia and other products. He laid stress on the need of perfecting a national motor fuel. Attempts had been made by distilling benzole with alcohol and an acid. If the problem was not solved in France, it would find its solution in Germany. There were rumours of a cartel being formed between the Germans and Italians for the exploitation of Italian lignites. The distillation of 4,500,000 tonnes of lignite yearly was contemplated.

M. CROLARD (the Chairman of the Committee of Mines) pointed out that they had no evidence of any interest in the lignite question on the part of the Government. Indeed, the Minister of Public Works responsible for the mines was not represented in the present discussion on benzole. It was a great pity they had not a technical body specially engaged in the study of lignites of all descriptions.

M. HERRIOT intervened that peat should be included.

M. CROLARD stated that he had been a member of the unofficial committee of inquiry into peat, and of the deputation to the Minister of Public Works on the best employment of fuels. When representations were made as to the importance of lignite, they were informed that it was not the business of the Department of Mines, which dealt only with fuels of vegetable origin having the appearance and properties of coal. Thus it came about that peat was ignored by the Department of Mines, and also lignite, because it did not happen to look like coal. There were also lignites of recent formation which were still in the woody stage.

M. BARTHE interrupted to say that these latter were of importance for distillation.

M. AJAUR pointed out that at the present time the control of petroleum was in the hands of the Ministry of Commerce. It was essential that all questions relating to fuel should be brought under one authority.

M. HERRIOT called special attention to the example of Canada and the United States in availing themselves of peat and lignite fuels. In particular, the United States, though possessing immense resources of coal, did not neglect these other fuels.

M. BARTHE (continuing) said he had formed the opinion that the Department of Mines undervalued lignite fuel. He feared that the great coal companies only perceived in it a competitor, and that there were certain underground propaganda going on for preventing advantage being taken of lignite.

M. CHARLES BARON expressed the view that the lignite question assumed a different complexion from the process of pulverization of fuels. The 40 p.ct. volatile matter of lignites made them bad fuels for ordinary furnaces; but this very defect became a merit in the use of pulverized fuel, such as had developed considerably in America, where modern methods of employing fuel were replacing failing supplies of natural gas. The low ash content of American coals was a point in their favour; but remarkable results had been obtained in France, through improvements on the American system, with fuels containing as much as 32 p.ct. of ash. One coal of this kind, when burnt in pulverized form, had raised 7·5 kilos. of steam per kilo. of fuel, as compared with 2·5 kilos. previously. In a certain paper mills 6 kilos. of steam had been obtained in recent tests per kilo. of low-grade fuel, of which there were large deposits in France. Tests in locomotive boilers had given very promising results.

The MINISTER OF COMMERCE put in a remark in defence of the Ministry of Public Works, which, through a Committee, had examined the question of fuel economy with great thoroughness.

M. BARTHE (resuming his discourse) referred to naphthalene, which should become of great value in connection with alcohol. In the phenols and cresols from coal tar, they had also valuable substances. Their chemists would find a stable mixture which would replace petrol, and by adding a cheap hydrocarbon to alcohol would raise the calorific power of the latter to the 10,000 cals. of petrol. He had been informed of the advantage which could be taken of another bye-product, colophane. By distillation it yielded light resin oils, forming an excellent carburant for alcohol. In respect to this product, and also naphthalene, they were on the point of a notable achievement of French science; but experimenters were handicapped by the obstacles placed in their way for securing supplies of pure alcohol. During the war, the authorities were content to allow 5 p.ct. of denaturant, instead of the previous 10 p.ct.; but now they wished to return to the latter, in the face of competent advice, and of the fact that the pre-war proportion in Germany was 1·5 p.ct., and in Austria 2 p.ct. The cost of the denaturant raised the price of alcohol to a prohibitive figure; and unless the Government could show that a proportion of 5 p.ct. opened the door to fraud on a large scale, there was no case for further increasing it. It was a vital question for those interested in the development of a national motor fuel.

M. BARON, in recommending that the experts still attached to the explosive service should be engaged on fuel research, gave as a formula for motor fuel a mixture of one-third alcohol, one-third benzole, and one-third petrol.

The MINISTER OF COMMERCE declared that he would endeavour, with permission of the War Office, to establish a closer relationship between the explosive service and the departments engaged in the study of petrol and petroleum.

M. HERRIOT, referring to the part of the Bill relating to the extraction from gas of benzole and all other chemical products capable of use for defensive or industrial purposes, expressed his agreement with M. Barthe. But the extraction of 20,000 tonnes of benzole in gas-works and a further 20,000 tonnes from coke-ovens was a very partial solution. In 1913 the French consumption of benzole was 80,000 tonnes, of which Paris used 30,000 tonnes. Of the 820 works, only the four most important could extract benzole; and greater efforts would be required to obtain 80,000 tonnes. The anticipated yield of benzole from gas-works and coke-ovens was a highly optimistic one. Benzole extraction could hardly be undertaken in a works representing a town of less than 25,000 people; and the number of works which could take up the process immediately was therefore not large. The Government had shown that benzole from coal gas represented a very small part of motor fuel supplies, the quantity of which at present imported by France was more than 500,000 tonnes. But as regards another part of the Bill he had most serious doubts. It provided that henceforth in any new contract relating to the manufacture, supply, and distribution of coal gas the basis would be the calorific power of the gas. A municipal authority would enter into arrangements with a gas undertaking solely in terms of calorific power. The latter, he admitted, was a necessary basis, in view of the conditions under which gas was consumed; but he took exception to the fact that a minimum calorific power was fixed, and that the maximum was limited to 4500 cals. Such a measure appeared harmless on the surface; but it was serious for consumers and municipal bodies, and favourable only to the gas undertakings. In effect, it deprived municipal authorities of the power of fixing the calorific quality of the gas which they wished supplied to them. The reason for the provision in the Bill was, he believed, that the extraction of benzole involved a reduction of the calorific power of the gas. But the provision was of general application, and would apply when benzole was not extracted. It would appear that the Bill aimed at the development of coke-oven gas; and it further seemed to be based on the conclusion that the normal gross calorific power of gas from special coals rich in volatile matter is 5000 cals. By extraction of benzole this is reduced 250 cals. Therefore, if the Bill contemplated only the consequences of the extraction of benzole, it would have been sufficient to fix the calorific power at about 4750 cals. The fact that such a course had not been adopted was because it was wished to impose the manufacture of water gas, though this motive was not explicitly declared in the Bill. It was, however, the real reason for the article relating to calorific power. It had been reported by M. Charlot that the use of water gas brought the calorific value to 4300 cals.; so the maximum of 4500 cals. was adopted. He proceeded

to dilate on the poisonous properties of water gas, the use of which he condemned as a danger to the public. Altogether he considered that the measure deprived small municipalities, unprovided with facilities for testing, of all control of the quality of gas supplied to them. He criticized the provisions contained in the Bill respecting the scale of charges based on calorific power, and objected to the measure in so far as it reduced the calorific power, whether benzole was or was not extracted, and lowered the quality of the product without compensation to the consumer. Moreover, the use of water gas was sanctioned without any obligation to adopt means—such as giving the gas a distinctive odour—for the protection of the public. It was giving too much power to the gas companies. It seemed to him that the Bill provided for the reduction of the lighting power, calorific power, and pressure of the gas. The only thing left was its price. He proposed that the gross calorific power should not exceed 4700 cals. (instead of 4500 cals.), nor fall below 3500 cals.; that the price of the gas should be based on the number of calories; and the proportion of water gas should not exceed 20 p.ct.

M. CHARLOT, whose report in favour of the Bill figured largely in the debate, stoutly supported the measure as part of a national fuel policy. It did not consist simply in the extraction of benzole from coal gas. No secret had been made of the object of fixing the maximum calorific power at 4500 cals.—it was to allow of the use of water gas in coal gas, not merely on grounds of economy, but for the conservation of the national fuel resources. If water gas were generally used, there would be a reduction of a million tonnes in the coal imported. As regards the alleged poisonous properties of water gas, they had the highest hygienic authority for permitting a proportion of 15 to 18 p.ct. Water gas, moreover, did not require the supply of costly imported coals. In France, coal of inferior quality was commonly carbonized in admixture with the best Sarre coal, or that imported from England. If such mixtures were permitted, the calorific power fell considerably. With such mixtures a calorific power of 4700 or 4800 cals. could not possibly be produced. Therefore it was necessary to lower the calorific power in order to permit of the use of local coal supplies. Again, the metallurgical industry in France used 14 million tonnes per annum, and in its coking furnaces allowed a loss of heat equivalent to 3 million tonnes of coal. Hence a fuel policy must aim, not only at extracting all the bye-products from these coke-ovens, but also at mixing them with coal gas, as was done at Essen and St. Etienne. In the liberated districts of the North East, which had still to be reconstructed, there were numerous coking plants, a large proportion of the gases from which were lost. These latter could be advantageously used in admixture with coal gas; and this was a contingency requiring to be kept in view. Since, however, blast-furnace gas had a calorific power of from 2500 to 2800 cals., a standard of 4500 cals. could not be imposed. If use were to be made of the mixture, with consequent enormous economy of coal, the calorific power required to be limited to a maximum; and this was what the Bill did. It provided for a scale of calorific power bounded by limits within which municipal authorities could exercise their functions. In some places—*e.g.*, iron-working districts—the calorific power could be as low as 3600 or 3800 cals. In Paris 4500 cals. had been accepted by the Municipal Council. As regards the price, this was not fixed arbitrarily, but was determined in accordance with the cost of coal, wages, &c., and the value of bye-products. Municipal authorities thus obtained gas at a price which fluctuated with the price of coal, and therefore benefited by the use of local or regional coals. They should know, moreover, that the value of the bye-products was deducted in fixing the price of the gas. He saw no objection to an amendment that the price of gas should be also proportioned to the calorific power.

M. HERRIOT objected that the contracts to be entered into under the proposed legislation would be for terms as long as forty years. At the present time, in accordance with the Bordeaux judgment,* contracts with gas undertakings contained a complex formula for computation of the price of gas, on the basis of wages, price of benzole, &c. But this state of things was temporary. Formulæ were misleading. The application of the formula authorized by the Bordeaux judgment to the pre-war period gave a price of gas twice that then in operation.

M. CHARLOT replied that it was possible that a formula based on later economic conditions would indicate a higher price under pre-war conditions. But it should be borne in mind that new plant laid down by the companies had cost three, four, or five times pre-war amounts, and therefore charges on capital would inevitably increase the price of the gas. The interests of all parties concerned were considered in the Bill as modified.

M. LESACHÉ confessed that he regarded the facilities for the use of water gas granted by the Bill as a free gift to the gas companies. It was said that municipal bodies were not powerless, but had technical and legal advice at their disposal. His experience at Troyes had led him to doubt this assurance; and he instanced an occasion on which appeal to official quarters had cost consumers in his town 500,000 frs. Unamended, the Bill appeared to compel municipal bodies to accept the calorific powers dictated by the gas companies. On this point, M. Herriot's amendment would be a sufficient safeguard for the public. He proposed a further one—that, in the case of current contracts, the use of water gas should be made conditional upon a reduction of the price of the gas equivalent to the economy effected—for he contended that the measures contemplated in the Bill applied to existing as well as to future contracts. That such was the case followed from the conditions under the Bordeaux judgment. Contractual terms required regularly to be modified, and on the first such occasion would be brought within the terms of the new Act.

M. CHARLOT disagreed, and said the Bill did not alter the terms of existing contracts.

The MINISTER OF COMMERCE, however, said he regarded a revised contract as a new contract; but when it came to revision, municipal bodies would be protected under common law. He drew special attention to the fact that heads of municipalities could obtain all

* See "JOURNAL," Vol. CXXXIV., pp. 75, 127, 593.

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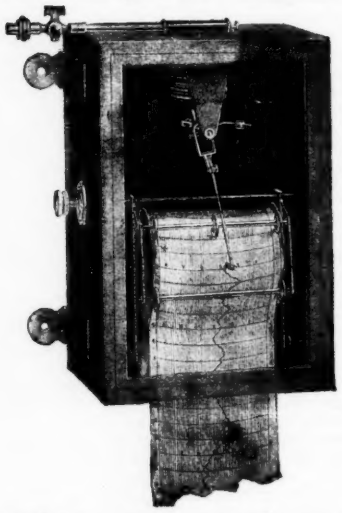

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necessary help and information from the Ministry of the Interior. They were not bound to act on it; but it could do them no harm to have it.

M. OUDIN contended that the Bill left the door open for fresh demands by the gas companies.

M. HERRIOT, replying to further discussion, said he could not object to Article 2. They all wished to permit the extraction of benzole; but they wished to amend Article 2 in four important respects: (1) A maximum gross calorific power of 4700 cals.; (2) a minimum of 3500 cals.; (3) price, proportional to heat rating; (4) maximum water-gas content, 20 p.ct. The fourth amendment would not prevent local authorities from agreeing to only 5, 10, or 15 p.ct. [M. CHARLOT: Or none at all.] Thus amended, the Bill would give numerous advantages to municipalities and consumers.

The MINISTER OF COMMERCE pointed out that the chief object of the Bill—the extraction of benzole—might be defeated by the qualified opening of Article 2—*i.e.*, "when not contrary to the specifications of the quality of gas"—particularly if the higher maximum (4700 cals.) of calorific power desired by M. Herriot were adopted. He suggested that the word "expressly" should be inserted after "when not."

M. HERRIOT maintained that a maximum of 4700 cals. was consistent with the extraction of benzole. Nevertheless, he accepted the amendment to the qualification, though he feared the result of the measure would be the making of a great deal of water gas, instead of the recovery of benzole.

Following further debate on the desirability of returning the Bill to the Committee for further examination,

The PRESIDENT read Article 1 in its original form, and also as amended by M. Barthe as follows:

> From the date of the promulgation of this Act, any contract relating to the manufacture, distribution, or supply of gas shall (on pain of becoming invalid) be made or modified in any respect only on the condition that the quality of the gas supplied or distributed shall be defined solely by its so-called gross calorific power, which shall not exceed 4500 calories per cb.m. at 0° C. and 760 mm.

M. Barthe withdrawing this amendment, that of MM. Herriot and Lesaché was read, put to the Chamber, and voted as follows: In the original draft, the part of the article following the words "gross calorific power" shall read:

> which shall not exceed 4700 calories per cubic metre measured dry at 0° C. and 760 mm. pressure of mercury, nor be less than 3500 calories; the price of the gas being proportional to the calorific power. The proportion of water gas shall not exceed 20 p.ct.

In the debate on Article 2, MM. Lesaché and Israel proposed to redraft the portion following the words "supplied by him (or them)," to read: "benzole and the various products necessary for manufactures relating to national defence."

M. LESACHÉ justified the amendment on the ground that the article in its original form was too general. By authorizing the removal of substances "necessary for industry or consumption," it gave too wide powers to the companies.

M. BARTHE, on the other hand, proposed an amendment that the opening words of Article 2—viz.: "When not contrary to the specifications of the quality of gas contained in their contracts or agreement"—should be omitted.

This amendment, on being put, was carried; that of MM. Lesaché and Israel being subsequently negatived.

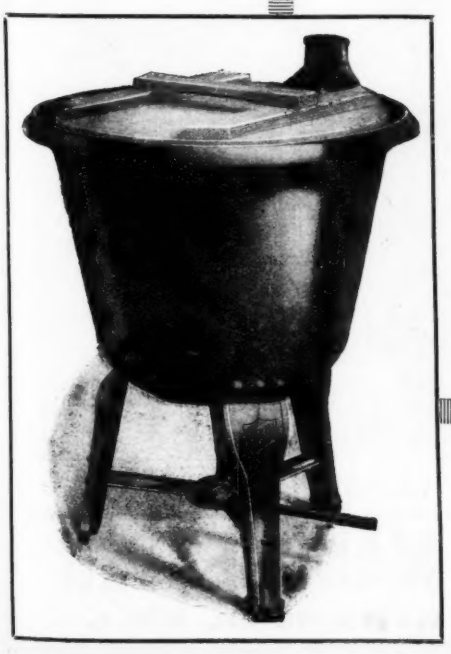
The whole Bill was finally adopted by the Chamber.

GAS PRICES IN BIRMINGHAM.

The Committee's Proposals Agreed To.

The report of the Gas Committee [*ante*, p. 172], in which they recommended that application be made to the Board of Trade for a further Order authorizing an increase in the maximum charge from 5s. to 6s. per 1000 c.ft., and that from the September reading of the meters the price of gas be increased 8d. per 1000 c.ft., came before the Birmingham City Council at their meeting on Tuesday of last week—the LORD MAYOR (Alderman W. A. Cadbury) presiding.

Alderman LLOYD, in moving the adoption of the recommendations, said the Committee very much regretted the necessity which had arisen for further increasing the price of gas; but the position was such that they had no option but to ask for authority to do so. When the price was increased to 4s. 10d. per 1000 c.ft., the Committee hoped the department would be able to carry the additional financial burdens incurred. These hopes, unfortunately, were not realized; and the Committee thought it advisable to warn the Council that the expenditure of the department was exceeding the income. At that time they refrained from recommending any addition to the price, until they were in a better position to gauge the financial situation. The unlooked-for length of the coal dispute had a disastrous effect upon the finances of the department, and had involved a loss of at least £140,000. Even with the restrictions placed upon the consumption of gas, the Committee experienced the utmost difficulty in maintaining the supply; but, notwithstanding the severe strain upon all concerned, it was pleasing to record that the difficulties which surrounded the department were overcome, though at a cost which had still to be met. The whole of the stocks of coal and oil in hand at the commencement of the trouble were used; but fortunately gas oil could be purchased from time to time, with the result that all the carburetted water-gas plants were kept going to the utmost extent. Otherwise the gas supply within the department's area, which included Wednesbury, Darlaston, and Sutton Coldfield, would have broken down. When the stocks of coal were exhausted, recourse had to be had to foreign coal; and several cargoes of American gas coal, amounting in all to approximately 20,000 tons, were obtained. The cost of this coal, which could



MAIN'S LAUNDRESS BOILER.

An "All-Cast" Boiler of new design. Constructed throughout of strong cast iron. Hob galvanized. Boiling pan made rustless. Lift-off lid, either wood or galvanized sheet iron.

Splash edge provided on top, which drains inside the boiler. Combined flue and condense outlet mounted on swivel hob, so that it can be placed in a position most convenient to the flue exit.

Drip-proof burner of novel construction fitted with gas regulator. Coneless flame with increased efficiency. Either fixed or removable at will. Fitted with a swing gas connection which receives the gas supply from any direction.

R. & A. MAIN, LTD.,

EDMONTON, N. 18., FALKIRK, &c.

only be bought at a price delivered at a port in the United Kingdom, was very heavy; the department having also to bear the cost of unloading the vessels and of transporting the coal to the various gas-works by rail. During the closing stages of the strike, the cost of manufacturing gas was approximately 10s. 9d. per 1000 c.ft., or about two-and-a-quarter times the highest price charged for gas. A careful estimate of the ways and means had been prepared, in order to ascertain what the financial position of the department would be on March 31 next. After taking credit for possible savings in various directions, which might or might not be realized, he regretted to say the statement showed a deficiency of upwards of £100,000, to which must be added £60,000, the amount estimated to be spent during the current financial year on account of the reconstruction now proceeding at the Nechells works. This meant that over £160,000 additional revenue must be found between now and the end of March, assuming the anticipated savings were realized; and inasmuch as 1d. increase would only provide £20,000 to £22,000 during that period, it was necessary to increase the price by 8d. per 1000 c.ft. in order to place the department in approximately the same position as on March 31 last. He referred to the serious effect which the slump in the residual market was having upon the finances of the department.

Mr. HAMPTON moved an amendment that the question be referred back, and reconsidered, if necessary, at the October meeting of the Council. He said the present was a most inopportune time to increase gas charges. Relief would be obtained by drawing from the reserve fund; and he thought the position could be met by creating a suspense account, and raising the price of gas to the limit of 5s. per 1000 c.ft.

Alderman WILLIAMS said no good result could be obtained by referring the matter back. There was a loss on the undertaking which had to be met by increasing the price of gas or by putting the concern on the rates.

Alderman LLOYD promised that if by any chance circumstances should change between now and September, and it was found unnecessary to impose the increase, the Committee would see that the price was not put up.

The amendment was lost, and the resolutions carried.

SUPPLY OF COKE-OVEN GAS TO MIDDLESBROUGH.

The Middlesbrough Corporation decided on Monday of last week to further raise the price of gas—to 4s. per 1000 c.ft. The Gas Committee reported upon interviews between Alderman J. Calvert (Chairman) and Mr. Arthur Dorman, with Sir B. Samuelson and Co., Ltd., with reference to the supply of coke-oven gas. The Committee recommended that the best arrangements possible should be made with the firm, and that the Town Clerk should be authorized to prepare a supplemental agreement; and that from the next reading of the meters the price of gas should be increased by 1s. per 1000 c.ft., making the amount chargeable 4s. net.

Alderman CALVERT, in moving the adoption of the minutes, said that, at very great loss to themselves, the firm who supplied Middlesbrough with coke-oven gas had kept the ovens in such a state as to be able to start as soon as coal was forthcoming. The blast-furnaces in the town might not be started for six or eight weeks; and the firm were not bound to supply Middlesbrough with gas during that period. If they waited until the ovens came into operation again, the Corporation would be placed in the position that they could not give the town a full supply of gas. They had had to see if they could discover a way out; and it had been found through the owners of the coke-ovens being willing to operate the ovens for a period (which they hoped would not be longer than six weeks) for a considerable supply of gas, but not the normal supply. The firm would thus suffer very serious loss, as they would be producing coke for which there was no market at cost price; and it had been agreed to pay a sum in compensation for the loss incurred. As a result of this, Middlesbrough had been able to get a supply of coke-oven gas during that week; and over the six weeks they would obtain such a quantity as, added to the supplemental supply, would be sufficient to meet the full service again. It was a beneficial arrangement to the town; but it would bring the price of gas up to 4s. On the other hand, it had to be remembered that, if there had not been this coke-oven gas supply, the price of gas in Middlesbrough would have gone up just as much as in other towns, which had increased the charge to a greater extent.

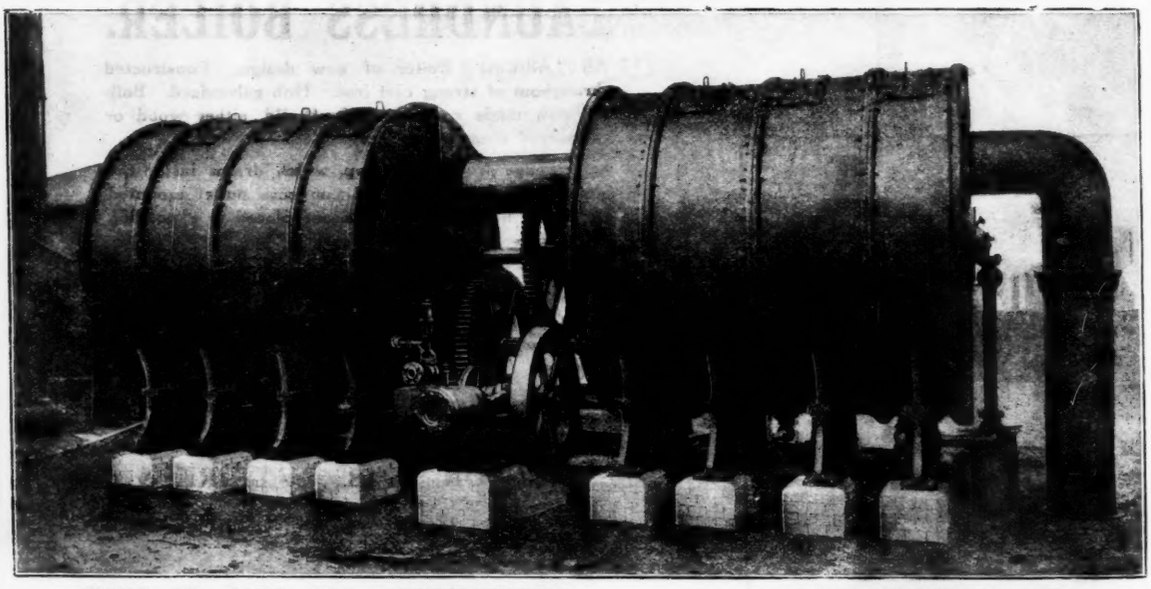
A NEW HOLDER AT MINEHEAD.

A new gasholder for the Minehead Gas Light and Coke Company, Ltd., was on the 12th inst., in the presence of a numerous gathering, formally handed over by Messrs. Willey and Co., Ltd., of Exeter (the Contractors), who afterwards invited the party to luncheon at the Plume of Feathers Hotel, where congratulatory speeches were made. Mr. F. Templer Depree (the Chairman of Messrs. Willey and Co.) presided; and he was supported by Mr. James Phillips (the Chairman of the Minehead Gas Company) and Mr. R. Beynon, of Torquay.

After the Loyal Toast, the Chairman proposed "Prosperity to the Minehead Gas Company," who said Messrs. Willey's connection with the undertaking dated back a great many years. The works were originally built in 1869, and were enlarged by his firm some ten or twelve years after. Messrs. Willey also carried out subsequent extensions. The Gas Company had in their Manager (Mr. E. P. Vince) a man who was putting all his energy in the most effective manner into his work, which had been of an extremely laborious character. The shareholders of the Minehead Company were fortunate in having Mr. Vince, and the Contractors in having their Engineers (Mr. F. Clapham and Mr. R. J. Rew).

In reply, Mr. Phillips said the Company obtained permission from

ROTARY SCRUBBER WASHERS



MADE TO SUIT ALL REQUIREMENTS. LATEST IMPROVEMENTS.

R. & J. DEMPSTER, LTD., MANCHESTER

LONDON OFFICE: 34, VICTORIA STREET, WESTMINSTER, S.W. 1.

the Treasury to increase their capital, and gave the order to Messrs. Willey to erect a holder which would contain 110,000 c.ft. of gas. The storage up to that time was only 55,000 c.ft.; but they were sending out 100,000 and 110,000 c.ft. a day, and during last August they sent out 140,000 c.ft. a day. The new holder was a splendid piece of work. There were 97,458 rivets in the holder, and not a single leak. It was a credit to the firm who erected it.

Mr. A. G. While (the Chairman of the Swindon Gas Company) proposed "The Town and Trade of Minehead," and Mr. C. Blackford (Solicitor to the Minehead Gas Company) "The Constructing Engineers and Contractors." In his response, Mr. Rew emphasized the great amount of assistance that had been received from Mr. Vince.

COAL PRICES AT STOKE-ON-TRENT.

In the minutes of the Gas Committee which were submitted to the Stoke-on-Trent Town Council last Thursday, it was stated that the Gas Engineer (Mr. A. Mackay) had reported that during the industrial crisis a loss of £14,000 had been incurred by the gas-works, and that he would ask the Committee at an early date to consider the question of further increasing the price of gas and coke with a view to meeting this loss.

Remarkable figures were submitted by Mr. Mackay showing the increase in the cost per ton of coal supplied to the four gas-works belonging to the Corporation. The figures are as follows:

Burslem.

	Nuts.
July, 1914	14s. 0½d.
February, 1921	40s.
P.ct. increase	184·86
New price, July, 1921	53s. 4d.
New p.ct. increase	279·82

Ferton.

	Coal.	Nuts.	Beans.
July, 1914	—	15s. 4½d.	14s. 10½d.
February, 1921	46s.	43s. 8d.	43s.
P.ct. increase	—	184·01	193·58
New price, July, 1921	—	*54s.	*54s.
New p.ct. increase	—	270·73	283·19

* Plus 3s. cartage.

Longton.

	Coal.	Nuts.
July, 1914	—	14s. 9d.
February, 1921	38s. 2d.	40s. 8d.
P.ct. increase	—	175·70
New price, July, 1921	—	53s.
New p.ct. increase	—	259·32

Stoke.

	Nuts.	Beans.
July, 1921	15s. 2½d.	14s. 8½d.
February, 1921	44s. 6d.	44s. 6d.
P.ct. increase	192·60	202·54
New price, July, 1921	*53s. 4d.	*53s. 4d.
New p.ct. increase	273·69	286·40

* Plus 3s. 6d. boating.

The Committee resolved that the Engineer be authorized to publish these figures, together with a protest from the Committee as to the prices asked; and that a copy of the figures be also sent to the North Stafford Miners' Federation, Mr. Hodges, the Secretary of the Miners' Federation, and the President of the Board of Trade.

GAS REGULATION ACT APPLICATIONS.

The following further notices have appeared in the "London Gazette" of applications by gas undertakings to the Board of Trade for Orders under the Gas Regulation Act.

City of Durham Gas Company.

The maximum prices now authorized in respect of the supply of gas by the undertakers are 4s. per 1000 c.ft. if the same be supplied within, and 5s. if supplied outside, the parliamentary borough; and the prices they have asked the Board of Trade to substitute for these are 1s. 6d. and 1s. 8d. per therm.

Mirfield Gas Company.

The standard price now authorized in respect of the supply of gas by the undertakers is 3s. 9d. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 1s. 5·1d. per therm.

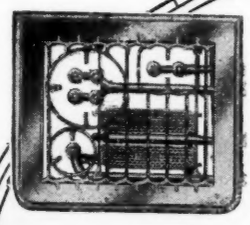
Otley Gas Company.

The standard price now authorized in respect of the supply of gas by the undertakers is 3s. 6d. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 1s. 6d. per therm.

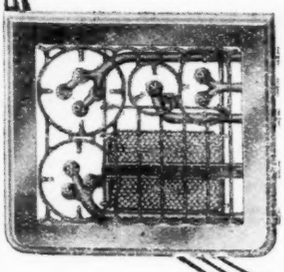
DECLARATIONS OF CALORIFIC POWER.

Kingston-upon-Thames Gas Company.—470 B.Th.U. (Aug. 2.)
Newark Gas Company.—410 B.Th.U. (Sept. 21.)
Slough Gas and Coke Company.—500 B.Th.U. (Sept. 15.)

The Public Control Committee of the London County Council have accepted the tender of Messrs. Parkinson and Cowan, Ltd. (Parkinson Branch), City Road, E.C., for the supply of three pairs of gasholders and fittings to the Harrow Road Gas-Meter Testing Office. The amount of the tender was £1050.



No. 128 and No. 129 Hot Plate.

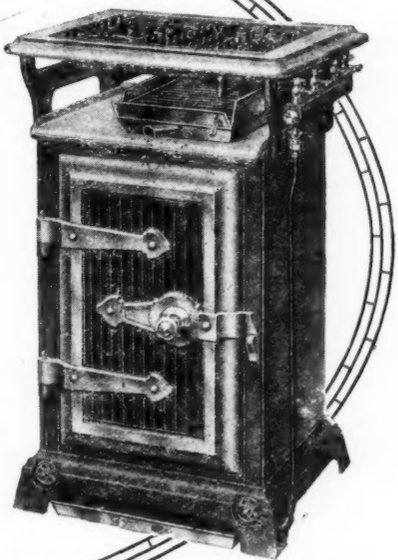


No. 130 Hot Plate (Hinged for Raising).

The Davis
Nos. 128, 129, & 130.

Efficiency Hot Plate

Green Porcelain Enamel Back and Sides.



The Davis Gas Stove Co., LTD.
Sales Dept. 60, Oxford Street, LONDON, W. 1.

GAS REGULATION ACT ORDERS.

There have been forwarded by the Director of Gas Administration copies of the following Orders made under section 1 of the Gas Regulation Act.

Irthlingborough Gas and Coke Company, Ltd.

After the declared date, the standard price in respect of gas supplied by the undertakers shall be 15·4d. per therm.

For the purpose of ascertaining the authorized rate of dividend for the year in which the declared date occurs, the price charged per 1000 c.ft. during that part of the year (if any) before the declared date shall be rendered into the equivalent price per therm by dividing it by five. (July 18.)

Maidenhead Gas Company.

After the declared date, the standard prices in respect of gas supplied by the undertakers shall be 17d. and 17·6d. per therm; and these prices respectively shall be substituted for the prices of 4s. and 4s. 3d. per 1000 c.ft. mentioned in section 34 (standard price of gas, dividend dependent on price charged) of the Maidenhead Gas Act, 1900.

For the purpose of ascertaining the authorized rate of dividend for the half year in which the declared date occurs, the price charged per 1000 c.ft. during that part of the half year (if any) before the declared date shall be rendered into the equivalent price per therm by dividing it by four-and-one-half.

Prepayment meter clauses are included. (July 21.)

CO-OPERATION BETWEEN THE GAS AND ELECTRICAL INDUSTRIES.

The possibility of co-operation between the gas and electrical industries, upon which evidence has already been given before the Electricity Commissioners in their inquiry into the electric power supply problem in London [see *ante*, p. 47], was again dealt with on Wednesday last.

Mr. *C. H. Merz*, who promoted the first Electric Power Bill dealing with London, in 1905, gave it as his view that large modern electric power stations must be worked in conjunction with coal distillation plants. He visualized the next large power stations as being built on very large areas—50 acres as the minimum—on which coal distillation plants would be erected; and a portion of the generating plant would be fitted for oil burning. Though, in certain circumstances, there would be no objection to co-operation between the gas industry and the electrical industry, he felt that, in the case of London, at any rate, the scale of operations would have to be so large as to justify the erection of separate coal distillation plants. In this way, the users of electricity would get the full benefit of the bye-products; whereas if, as was proposed by one of the schemes before the Commissioners, there was co-operation between a gas company and the electricity authority, the gas people would get all the benefits of the bye-products, and would merely sell to the electricity people the surplus coke on a basis of heat units in it, and relatively to the price of coal. For this reason, he was not in favour of co-operation in every case. He hinted that there was one process of low-temperature carbonization which was in a sufficiently advanced stage that within a very few years it could be applied commercially in the manner he had suggested. Commenting on the question of commercial management of these undertakings, he said that things would have been very different with the electrical industry if it had been managed in the same capable way as the gas industry, though he agreed that legislation had had a lot to do with retarding progress in the electrical industry. Bearing on the business ability of the leaders of the gas industry, he warned the nine electrical companies, on whose behalf Mr. Milne Watson gave evidence, that the business men in the gas industry would get the better of them if they were not careful.

Mr. KENNEDY (Counsel for the nine companies) asked what was meant by this. Did Mr. Merz suggest that Mr. Milne Watson, of the Gas Light and Coke Company, would not honour any agreement that was entered into?

Mr. *Merz* said of course not. What he meant was that the gas industry was in extremely capable business hands, and the likelihood was that all the electrical people would get out of any co-operation would be the surplus coke, leaving to the gas industry the benefit of the other bye-products. He would prefer that the electrical industry should obtain this benefit, and for this reason felt it would be better that the coal distillation plants worked in conjunction with large power stations should be independent of the gas industry.

The matter was closed by Mr. KENNEDY remarking that Mr. Merz could take it that any such agreement as that foreshadowed in the evidence already given would be between business people on both sides, who knew how to take care of themselves.

FULL SUPPLY MAINTAINED AT BRISTOL.

Mr. S. E. Halliwell, the Secretary of the Bristol Gas Company, writes that the supply of gas by the Company was maintained throughout the whole period of the national coal stoppage without any restriction or reduction of normal pressures; and considerable satisfaction has been publicly expressed in the city that full supplies were available during the critical days of coal shortage. Good stocks of coal had been accumulated by the Company; and at the commencement of the stoppage the engineering staff devoted immediate attention to the task of conserving stocks by a fuller utilization of the carburetted water-gas plant, and by steaming in the vertical installation.

The normal quantity of coal used during the period covered by the

ECONOMY OF COAL

This Testimonial

FROM A GAS ENGINEER

Should Convince You

DEAR SIRS, 1st *April*, 1921.

It may interest you to know the result of your suggestion that we should coat the front of our retort benches with "Everok" for the preservation of the brickwork and at the same time the conservation of heat.

I might first mention that we were unable to carry out your suggestion to apply the "Everok" by means of a spraying machine as such was not available and consequently had no alternative but to apply the "Everok" with an ordinary hand brush.

Even with this superficial application I am pleased to inform you that the brickwork shows absolutely no deterioration whatever after nine months' continuous use, although in the ordinary course of events (due to our unfortunate method of working) we should have anticipated signs of deterioration within two months. The preservation of the brickwork is so remarkable that I estimate we have already saved the cost of material and labour many times over apart from the question of economy in fuel. Even the workmen remark how nice and cool it is in front of the bench treated with "Everok."

Whilst I shall be delighted to allow any Engineer to inspect the Retort Bench in question and obtain any information he may require, I think the cost of labour and materials necessary to coat an ordinary retort bench so small compared with the remarkable results obtained that I have no hesitation in recommending every Gas Engineer to make the experiment for himself.

Yours faithfully,
Name on application.

EVEROK
THE WATERPROOFER

Is a colourless solution on the "NO-VOID" principle for rendering the surface of EXISTING CEMENT, CONCRETE, STUCCO, BRICK, STONE, &c., impervious to water or the destructive action of nature.

Manufactured by

THE TORBAY & DART PAINT CO., Ltd., 26, 27 & 28, Billiter St., LONDON, E.C.

stoppage is 60,000 tons; but this was considerably reduced by the production of the increased percentage of water gas. No special difficulty was experienced in giving satisfactory service to the 350,000 people who depended upon gas for cooking and other domestic requirements, apart from the re-adjustment of cookers by the introduction of air sleeves and diffusers devised and made by the Company's staff of fitters. The 50 p.ct. compulsory reduction imposed by the Emergency Powers Act on industrial users was in operation; but an increase in the percentage of day-load consumption proved the extent to which gas was used by householders and public institutions, which has been referred to as a "real boon," in view of the very limited supply of coal available for distribution in the city. In the latter part of June it was necessary to purchase several lots of imported coal, as the Directors decided, in the public interests, to "carry on" at all costs.

In addition, very large quantities of coke were distributed in the city and surrounding districts; and the bakers and institutions had full supplies during the whole of the period. Over 200,000 small lots of ¼ cwt. and 1 cwt. were sold to domestic consumers. The use of coke breeze for steam-raising is becoming increasingly popular in the district; and many special furnaces have been installed during the last three years. Over 16,000 tons were sold to industrial users during the coal stoppage. Despite the abnormal demand for coke and breeze, the Company supplied consumers at the pre-strike price.

The value of gas for the many purposes to which it can be applied, and the clear atmospheric conditions, have been topics of conversation in the city; and the gas industry has "once again" proved indispensable in the period of national emergency, as well as in normal times.

TRADE NOTES.

[For "Journal" Advertisers.]

Davis Gas Appliances for Housing Schemes.

It is felt that, in view of the recently announced modifications in the Government housing policy, special interest will attach to an exceedingly attractive booklet just issued by the Davis Gas-Stove Company, Ltd., of No. 60, Oxford Street, W., on the subject of cooking, heating, and hot-water appliances for housing schemes. It is precisely what it purports to be—a brief exposition of the case for gas in housing schemes, from the point of view of economy (structural and financial), convenience, and cleanliness. On opening the cover, one is met with irrefutable evidence of the saving of no less a sum than £62 11s. 10d. on the erection of a pair of semi-detached cottages equipped with "Nautilus" cast-concrete gas-flues and terminals, for all rooms except the living-room, as compared with the provision of ordinary fireplaces with brick flues and chimney stacks. Each of these cottages is fitted with four gas-fires, the cost of which (including all charges relating to the fixing) has been allowed for in the figures bringing out the saving. The attention of the reader will be arrested by two striking illustrations—one an example of a bungalow erected on the "Nautilus" principle, with "Auto-Vent" cast-concrete flues and roof terminals, and the other of a bungalow similarly fitted, but having eaves terminals (instead of the roof terminals). These eaves terminals can be fitted to any external wall; and their use enables the gas-flue stack to be dispensed with, and the costs incidental thereto saved. With a view of imparting to the booklet the maximum amount of usefulness to housing authorities and architects there are added illustrated particulars regarding a carefully-made selection of Davis gas apparatus for cooking, heating, and purposes of hot-water supply. There is quite a wide choice offered in neatly designed fires; while the hot-water section deals with circulating boilers, geysers, and washhouse boilers or coppers. To meet special circumstances, there is available for cooking purposes the Davis patent "Gascol" combination gas and coal range.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *July* 25.

There is a little better inquiry for tar products in the London market, but definite business is rather scarce. Values, however, remain steady. Pitch is from 80s. to 85s. per ton, net, in bulk at makers' works. Creosote is about 8½d. per gallon, net, in bulk at makers' works. There is a better demand for solvent naphtha and toluole, prices being 2s. 9d. and 3s. per gallon net, respectively, at works.

The demand for dehydrated tar still remains stiff; and the continuance of the good weather has enabled satisfactory deliveries to be made for road work.

Tar Products in the Provinces.

July 25.

The average values for gas-works products during the week were: Gas-works coal tar, 61s. to 65s. Pitch, East Coast, 80s. to 82s. 6d.; West Coast—Manchester, 77s. 6d. to 80s.; Liverpool, 77s. 6d. to 80s.; Clyde, 77s. 6d. to 80s. Benzole 90 p.ct. North, 2s. 4d. to 2s. 6d.; crude 65 p.ct. at 120° C., 1s. 11d. to 2s. naked at makers' works; 50-90 p.ct., naked, North, 2s. 3d. to 2s. 4d. Toluol, naked, North, 3s. to 3s. 1½d. nominal. Coal tar crude naphtha in bulk, North, 11d. to 11½d. Solvent naphtha, naked, North, 2s. 5d. to 2s. 6d. Heavy naphtha, North, 2s. 7d. to 2s. 9d. Creosote, in bulk, North, liquid, 9½d. to 9⅝d.; salty, 8⅝d. to 8¾d. Heavy oils, in bulk, North, 10½d. to 11½d. Carbolic acid, 60 p.ct., 1s. 6d. Naphthalene, £20 to £30; salts, £7 to £9, bags included. Anthracene, "A" quality, 8d. to 10d. per minimum 40 p.ct.; "B" quality, nominal.

FROM A MARKET CORRESPONDENT.

Tar Products.

The market for all products, with the possible exception of road tar, remains in a very uncertain state; and with little material being

RICHMOND'S

"Bungalow"

Cooker

owes its remarkable popularity to its departure in design from the ordinary gas cooker. Made in five sizes the "Bungalow" provides a complete series for households of from 3 to 18 persons.

Displayed in your Showroom window, these Cookers will attract, interest and convince.

"They head the Cooker Sales"

THE RICHMOND

GAS STOVE AND METER CO., Ltd.

WARRINGTON AND LONDON.

produced, it is difficult to give any idea of values. Practically nothing is being done in pitch, though prices are very firm as a result of many inquiries, probably in anticipation of the opening of the shipping season. It is reported from South Wales that 90s. per ton has recently been paid there. Certainly sellers are very reluctant; for as yet they are unable to gauge what quantities they are likely to obtain or what it might cost them. At any rate, probably the minimum quotation is 80s. per ton f.o.b. makers' works. Creosote is more scarce than ever, with a slight advance in quotations at 9d. per gallon; but unless there should be a very unusual demand, it is difficult to see how this price is going to be maintained. There is no change in naphthalenes; in fact, there is very little supply at the present time. Very little benzole is coming on the market; but at long last the rubber manufacturing industry seems to be recovering, and there are many inquiries therefrom for solvent naphtha. Supplies, however, are scarce, and nothing like adequate quantities are available until the coke-ovens get to work again; and this happy state of affairs seems a long way off. The nominal price of solvent naphtha is 2s. 9d. per gallon. There is absolutely nothing doing in carbolic acid. There is a small amount of crystal 40 p.ct. carbolic acid at about 6d. per lb. Cresylic acid is rather better at 2s. 6d. for pale 97/99, and 2s. 4d. per gallon for dark 95/97. There has been a distinct improvement in intermediate products during the past week, as a result of considerably more inquiries. This has been especially noticeable in aniline oil and salt and salicylic acid, although prices so far are unchanged.

Sulphate of Ammonia.

The recent reduction in the price of sulphate of ammonia has induced the placing of many substantial orders for August and September deliveries. There has also been a larger demand for export; and these together have substantially reduced stocks which manufacturers

STOCK MARKET REPORT.

THINGS on the Stock Exchange last week showed improvement over the preceding week in one respect—viz., that markets for the most part had a little more backbone in them. But as regards any increase of business activity, this unhappily was not discoverable; nor, indeed, can any be looked for now, with the August void close upon us.

The gilt-edged market was fairly good. In Home Government issues, the big four were little altered, Friday's figures being thus: Consols 48·48½, War Loan 88⅛-88⅜, Funding 70½-71, Victory 76 5/16-76 7/16. Bonds, Indian and Colonial issues, and Corporation Loans were, however, in good demand. Home Rails kept up, and Canadian and Argentine were all of them firm.

In the Foreign market, Belgian, Brazilian, Chinese, and Japanese stocks were in favour. In Miscellaneous, weakness predominated. Rubber was dull; and the Oil market was upset by the misfortunes of one or two important concerns. Textiles and Iron and Steel were dull.

Business in the Gas Market was on a diminished and diminishing scale, most of it in the two big Companies. A feature was the unusually large number of transactions in concerns classed as "supernumerary." General firmness was the characteristic; and the few changes in quotations were upward. Gas Light ordinary rose 1, and South Metropolitan and Commercial were steady. In Suburban and Provincial, both Brightons had a further good advance, and Lea Bridge rose 1. In Foreign, Imperial Continental and Primitiva were very quiet.

Bargains done for cash during the week were as follows: On Monday, Brentford "B" 64, British 22⅞, 23⅛, 23¼, Gas Light ordinary 55⅝, 55⅞, 56, 56⅛, ditto maximum 43, ditto preference 58½, South Metropolitan debenture 47½, Croydon 5 p.ct. debenture 75. On Tuesday, Continental Union 19, Gas Light ordinary 55½, 55⅞, 56, 56⅛, 56¼, 56⅜, ditto maximum 44, ditto preference 58½, ditto debenture 50½, Imperial Continental 131, Oriental 89¾, 91½, 92, Primitiva preference 26s. 6d., South Metropolitan 57½, 67⅝, 68¼, Cardiff 7½ p.ct. debenture 100¾, 101. On Wednesday, Alliance and Dublin 44, Brentford preference 68, Continental Union 18½, Gas Light ordinary 56¼, 56⅜, 56¾, ditto preference 59½, ditto debenture 50¾, 51¼, Imperial Continental 131, 132, ditto debenture 80, Oriental 88¾, 89¼, South Metropolitan 67⅝, Richmond 5 p.ct. ordinary 47, ditto 5 p.ct. preference 52, Waltham Abbey and Cheshunt 10 p.ct. 78s. 1½d., 79s. 4½d. On Thursday, British 23½, 23¼, Commercial 4 p.ct. 57, Continental Union 18, Gas Light ordinary 56½, Imperial Continental 131, South Metropolitan 67½, Waltham Abbey and Cheshunt 10 p.ct. 77s. 6d. On Friday, Continental Union preference 30, Derby 63, Gas Light ordinary 56⅜, 56¼, 56⅜, ditto preference 58⅜, ditto debenture 51¼, 51½. Imperial Continental 131, 132 (and exceptional 130), Newcastle 60, South Metropolitan 67½, 67⅝, 68⅛, South Suburban debenture 73½, Aldershot 5 p.ct. "C" 59½, 60, Barnet "C" 108½. Brighton and Hove 4 p.ct. debenture 55, 58, Cardiff 7½ p.ct. debenture 100¼, Sunderland 10 p.ct. maximum 85¾, Waltham Abbey and Cheshunt 10 p.ct. 79s.

In the Money Market, the all-important feature was the reduction of the Bank rate on Thursday from the 6 p.ct. (which had ruled just four weeks) to 5½ p.ct—a movement which was welcomed throughout the City with the greatest satisfaction. The demand for silver continued, and the price rose to 38d.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue.	Share.	When ex-Dividend.	Ante-War Dividend & Bonus.	Last Dividend.	NAME.	Closing Prices, July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
£			p.c.					
182,049	Stk.	Mar. 11	4	4%	Aldershot 4 p.c. Pref.	...	53—58	...
1,551,868	,,	Apl. 14	4	3 1/8%	Alliance & Dublin Ord.	56—64	39—44	44
374,000	,,	July 14	4	4%	Do. 4 p.c. Deb.	76—79	46—51*	...
280,000	5	Oct. 28	7½	4%	Bombay, Ltd.	5⅝—6½	3¼—4	...
100,000	5	Feb. 25	16	5%	Bourne- { 5 p.c.	...	7⅛—8½	...
383,110	10	,,	7	5%	mouth Gas { B 7 p.c.	15—15½	8½—9¼	...
115,000	10	,,	6	6/-	and Water { Pref. 6 p.c.	13¾—14	7⅛—8½	...
162,063	—	June 30	—	4%	{ 4 p.c. Deb.	...	54—59	...
992,045	Stk.	July 15	14	56/-	Brentford A Consolid.	261—266	63—68*	...
734,920	,,	,,	11	55/-	Do. B New	204—209	60—65*	64
55,000	,,	,,	5	5%	Do. 5 p.c. Pref.	109—111	67—71*	68
221,400	,,	June 15	4	4%	Do. 4 p.c. Deb.	91—93	56—58	...
214,775	,,	Mar. 11	11	7½%	Brighton & Hove Orig.	208—213	102—107	...
244,200	,,	,,	8	5½%	Do. A Ord. Stk.	154—159	75—80	...
1,287,500	Stk.	July 29	5	5%	Bristol 5 p.c. max.	...	...	...
530,000	20	Mar. 30	12½	10%	British {	44—45	22—24	22½—23½
120,000	Stk.	June 30	4	4%	Do. 4 p.c. Deb. Stk.	88—90	53—56	...
245,771	,,	,,	4	4%	Buenos Aires 4 p.c. Deb.	85—87	36—39	...
100,000	10	May 27	4	4%	Cape Town & Dis., Ltd.	1½—2½	6½—7½	...
100,000	10	Apl. 28	—	6%	Do. 4½ p.c. Pref.	4—6	4½—5½	...
100,000	Stk.	June 30	4½	4½%	Do. 4½ p.c. Deb. Stk.	70—75	53—58	...
137,150	,,	Feb. 26	5	5%	Chester 5 p.c. Ord.	108—110	...	...
1,513,280	,,	Feb. 25	5/9/4	42/8†	Commercial 4 p.c. Stk.	106—108	55—60	57
560,000	,,	,,	5½	38/4†	Do. 3½ p.c. do.	103—105	52—57	...
475,000	,,	June 15	3	3%	Do. 3 p.c. Deb. Stk.	69½—71½	42—45	...
800,000	,,	Dec. 31	4	—	Continental Union Ltd.	76—79	17—22	18—19
200,000	,,	,,	7	—	Do. 7 p.c. Pref.	115—118	30—40	30
51,600	,,	Feb. 5	15	10%	Croydon A 10 p.c.	...	125—135	...
278,400	—	,,	12	7%	Croydon B and C 7 p.c.	...	95—105	...
492,270	Stk.	,,	6	4½%	Derby Con. Stk.	123—125	...	63
55,000	,,	—	4	4%	Do. Deb. Stk.	102—104	...	...
1,002,180	10	Jan. 29	10	5/-	European, Ltd.	17½—18	7—8	...
16,298,975	Stk.	Feb. 10	4/17/4	30/-	Gas { 4 p.c. Ord.	98—102	56—58	55½—56¾
2,600,000	,,	,,	3½	26/3	Light { 3½ p.c. max.	76—79	42—45	43—44
4,062,235	,,	,,	4	4%	and { 4 p.c. Con. Pref.	96—99	57—60	58½—59½
4,674,850	,,	June 15	3	3%	Coke { 3 p.c. Con. Deb.	72½—74½	49—52	50½—51½
130,000	,,	Dec. 11	10	10%	{ 10 p.c. Bonds.	...	...	...
82,500	,,	Mar. 11	5	3½%	Hastings & St. L. 5 p.c.	...	48—53	...
258,740	,,	,,	3½	2½%	Do. 5½ p.c.	87—89	34—39	...
70,000	10	May 12	11	5%	Hongkong & China, Ltd.	16½—16¾	5—6	...
86,600	Stk.	Mar. 11	9	5½%	Hornsey 7 p.c.	...	75—85	...
131,000	,,	Mar. 30	7½	3½%	Ilford A and C	151—154	76—81	...
65,780	,,	,,	6½	2½%	Do. B	115—118	55—60	...
65,500	,,	June 30	4	4%	Do. 4 p.c. Deb.	92—94	53—55	...
1,976,000	,,	May 27	9	5%	Imperial Continental	150—160	131—136	131—132
1,235,000	,,	Feb. 10	3½	3½%	Do. 3½ p.c. Deb. Red.	84—86	77—82	80
235,244	,,	Mar. 30	6½	3½%	Lea Bridge Ord. 5 p.c.	119—121	68—73	...
3,498,905	,,	Feb. 26	10	57/6	Liverpool 5 p.c. Ord. { A.	211—213	...	...
306,085	,,	June 26	4	4%	{ B.	146—148	...	...
165,796	,,	Feb. 25	7/5/6	3½%	Do. 4 p.c. Pr. Deb. Stk.	...	...	...
63,480	,,	Dec. 30	—	3%	Maidstone 5 p.c.	...	52—57	...
75,000	5	June 11	6	3%	Do. 3 p.c. Deb.	...	40—43	...
250,000	100	Apl. 1	4½	4½%	Malta & Mediterranean	4½—4¾	1¾—2¼	...
541,920	Stk.	May 27	4	6%	Met. of	99—101	88—93	...
1,875,892	,,	Feb. 25	4½	3½%	Melbourne { 4½ p.c. Deb.	11½—12	60—70	...
529,705	,,	June 30	3½	3½%	Monte Video, Ltd.	98½—99½	59—60	60
15,000	10	Mar. 11	—	8%	Newcastle & Gatsh'dCon.	82—83	48½—50½	...
55,940	10	,,	7/14/0	58%	Do. 3½ p.c. Deb.	...	12¾—13¾	...
300,000	Stk.	May 12	8	8%	North Middlesex 10 p.c.	14—15	7¾—8¼	...
60,000	5	Mar. 26	10	1/-	,, ,, 7 p.c.	117—122	87—92	88½—92
188,120	Stk.	June 30	—	3½%	Oriental, Ltd.	7¼—7¾	2—3	...
60,000	50	Feb. 25	13	7½%	Ottoman, Ltd.	...	53—58	...
100,000	50	,,	12	6½%	Plym'th & Stoneh'se 5 p.c.	128—131	65—70	...
249,980	5	April 29	8	—	Portsea Island, B	118—121	50—55	...
499,960	5	June 26	5	—	Do. C	5½—6	...	...
521,600	100	June 1	4	4%	Primitiva Ord.	4¾—5	1¾—2	26/6
600,000	Stk.	Jan. 27	4	4%	Do. 5 p.c. Pref.	91—93	65—67	...
346,198	,,	June 30	4	4%	Do. 4 p.c. Deb.	...	37—40	...
150,000	10	Mar. 30	6	6/-	Do. ,, ,, 1911	85—87	36—39	...
125,000	50	June 30	5	5%	River Plate 4 p.c. Deb.	103—11	54—6½	...
135,000	Stk.	Mar. 30	10	5%	San Paulo { 6 p.c. Pref.	47—49	34—39	...
209,984	,,	,,	10	5%	{ 5 p.c. Deb.	223—224	62—64	...
523,500	,,	,,	10	4½%	Sheffield A	222—224	62—64	...
133,201	Stk.	Sept. 15	4	4%	Do. B	220—222	61—63	...
90,000	10	June 30	9	8%	Do. C	...	...	...
6,609,895	Stk.	Feb. 10	5/4/0	5%	Shrewsbury 5 p.c.	10½—11½	8—10	...
250,000	,,	July 14	—	5%	South African	111—113	67—69	67½—68½
1,895,445	,,	,,	3	3%	South Met. Ord.	...	91—93*	...
224,820	,,	Feb. 25	8½	7½%	Do. Red. Pref.	72½—74½	46—49*	47½
1,087,795	,,	,,	6	3½%	Do. 3 p.c. Deb.	157—159	85—87	...
368,837	,,	June 30	5	5%	South Shields Con. Stk.	114—116	60—65	...
647,740	,,	May 12	7½	3½%	S'th Suburb'n Ord. 5 p.c.	116—118	71—76	73½
121,275	,,	June 30	4	4%	Do. 5 p.c. Deb. Stk.	99—102	55—58	...
120,000	,,	Feb. 25	—	4%	Southampton Ord.	...	56—58	...
784,275	,,	,,	6	3½%	Do. 4 p.c. Deb. Stk.	135—138	59—63	...
181,255	,,	June 15	4	2½%	Tottenham { A 5 p.c.	115—117	50—55	...
182,380	10	Dec. 30	5	4%	District { B 3½ p.c.	87—89	52—55	53½—54½
140,900	10	July 1	5	5%	{ 4 p.c. Deb.	5—6	1—2	...
256,476	Stk.	Feb. 25	5	3½%	Tuscan, Ltd.	93—95	45—50	...
30,000	,,	Feb. 25	8½	47/6	Do. 5 p.c. Deb. Red.	108½—109	68—70	...
255,636	,,	,,	6½	32/6	Tynemouth 5 p.c. max.	...	...	...
108,075	,,	,,	—	33/3	Wandsworth, Wimbledon, and Epsom—	...	...	...
140,365	,,	,,	—	33/3	Wandsworth A 5 p.c.	151—156	78—83	...
352,000	,,	,,	6½	26/3	Do. B 3½ p.c.	129—134	55—60	...
98,000	,,	,,	6½	32/6	Do. C	...	55—60	...
88,416	,,	June 30	5	3%	New Ordinary	...	55—60	...
					Wimbledon 5 p.c.	117—123	57—62	...
					Epsom 5 p.c.	121—126	55—60	...
					5 p.c. Deb. Stk.	66—60	40—45	...

* Ex Div. † Next dividend will be at this rate.

were carrying. Stocks may now be considered as below normal, due also to a falling-off in production as a consequence of the coal strike, which effects will continue to be felt for months to come. The export market at the moment is quiet, with prices between £15 and £16 per ton. A very favourable feature in this section of the market is that Japan, whose trade so far had been lost to this country, has now come back as a buyer.

Hamilton Gas-Works Accounts.—The Hamilton Corporation Gas Committee's annual report shows a balance of £4418, inclusive of £718 brought from the previous year. The sum of £1367 is placed to the reserve, which now stands at £4765. The Committee recommend that £3000 be voted to the Common Good. The balance of £1418 is carried forward.

A Vote of Thanks at Rhyl.—At a meeting of the Urban Council of Rhyl last week, Mr. Snape proposed a vote of thanks to the Gas Engineer (Mr. L. G. Hall) and his staff for the way they had worked during the coal strike. He personally thought they had saved the town. Mr. E. Hughes seconded; and the Town Clerk said that Rhyl had had its full 50 p.ct. supply of coal available during the strike. Mr. Clews thought it a dangerous precedent in the circumstances to pass such a vote. Mr. Cain, however, said they should be honest, whether it was a precedent or not. The Engineer and staff had done more than their duty.

Coalowners and Contracts.—In the course of a discussion on gas-coal contracts at last week's meeting of the Bingley District Council, Mr. T. Turner (Chairman of the Gas Committee) said the Council on the one hand had been advised not to make immediate contracts, and on the other hand had been informed by the coal-owners that their wish was that gas authorities should make contracts as in 1914, and that the alternative to this course being adopted without delay would be an increase of 3s. per ton when contracts were made. Mr. Turner said the position at Bingley had been exceedingly good during the strike by comparison with many places, in spite of occasional lapses in the supply of gas.

Gas Testing in London.—As a provisional arrangement, it has been recommended by the Public Control Committee of the London County Council that, in substitution for the fees now in force, a flat-rate of 16s. a testing on week-days and 20s. a testing on Sunday be paid to gas examiners at each of the testing places within the jurisdiction of the Council, as from and including the date of operation of the forthcoming notification of the Gas Referees. It was understood, said the Committee, that a new "Notification" modifying the existing testing arrangements in accordance with the Gas Regulation Act, 1920, would be issued by the Referees within the next few weeks; and the Referees have intimated their intention to prescribe two calorific tests daily at each of the testing places in London. This will, it is anticipated, result in a reduction in the amount of work at the testing places in the district of the South Metropolitan Gas Company, though there may be an increase in the work throughout the districts of the Gas Light and Coke Company and the Commercial Gas Company. As the "Notification" will probably be received while the Council are in recess, the Committee thought it desirable to make in advance a provisional modification of the existing scale of fees. The present rates of pay are: In the districts of the Gas Light and Coke Company and the Commercial Gas Company: 16s. a testing; number of calorific tests, one daily. In the district of the South Metropolitan Gas Company: 25s. a testing on week-days and 30s. a testing on Sunday; number of calorific tests, three daily at intervals of not less than three hours. It is not yet possible accurately to estimate the amount of extra work (if any) which will be involved in the districts of the Gas Light and Coke Company and the Commercial Gas Company.

Monarch Mantles, Ltd., is the title of a Company lately registered to carry on the business of incandescent mantle manufacturers. The capital is £30,000, in £1 shares.

Tully Gas Plants, Ltd., have received a duplicate order for a 100,000 c.ft. set from the Cirencester Gas Company, and for a 50,000 c.ft. set from the Moffat (N.B.) Gas Commissioners.

The Kidderminster Chamber of Commerce have protested against the new gas prices in the town on the ground that the charges in therms instead of cubic feet are not understood by the ordinary layman, and that the increase in the prices is unjustifiable at the present time.

The Skipton Urban District Council have received an application from the gas-works employees for an additional three days' holiday per annum, making twelve days in all, as in the case of other Council workers. The application was conceded.

Work has now been re-started at the collieries of the Staveley Coal and Iron Company, Ltd., which remained idle after the general settlement, owing to a local dispute. The firm's pipe-foundries are therefore in a position to resume active operations.

A verdict of "Suicide by gas poisoning" was returned at an inquest at Halifax, on Fred Summerscales, a mill mechanic, who was found unconscious, with a rubber tube from the gas-bracket to his mouth, and the gas turned on. He had suffered from neurasthenia for many years, and two years ago attempted his life in a similar manner.

The Directors of the British Dyestuffs Corporation state that, in view of the unsatisfactory trading results for the half year ended April 30, due to the general depression in the textile and other colour consuming trades, they are unable to recommend the payment of an interim dividend on the preference shares in respect of that period.

The Ossett Town Council have approved a recommendation of the Gas Committee that application be made to the Ministry of Health for power to borrow £3485 for the purchase of a Tully water-gas plant, including foundations and connections; £391, the price of an economizer; and £805, the cost of a steam-boiler, with foundations and connections.

Sports and co-partnership meetings of the South Suburban Gas Company are to be held at the Crystal Palace next Saturday. The sports will be followed by tea; and then the co-partnership meeting in the Concert Hall will be presided over by Mr. Charles Hunt, the Chairman of the Company. Afterwards, the sports prizes will be distributed by Miss Hunt.

The employees of the London works of the George Wilson Gas-Meter Company held their first annual outing on Saturday, the 16th inst., when they proceeded by motor charabanc to Brighton. At the luncheon, the chair was taken by Mr. J. H. Wilson, Managing-Director of the Company, who expressed his appreciation of the spirit of good comradeship and loyalty which existed among all the London employees of the Company. The whole proceedings passed off most successfully, and an enjoyable day was spent by all.

In the case of Samuel Allison, aged 81, a police pensioner, the Birkenhead Coroner returned a verdict that death was due to gas poisoning, but that the evidence was insufficient to show how a gas-bracket had become broken. The deceased went to bed, and was found dead the following morning, the room being full of gas. The top part of the window was open. The gas-bracket was broken, and was hanging down. It was stated that the gas had not been used for some months. Mr. Allison had been seen at times to catch hold of the bracket when looking out of the window; and the assumption was that he had done this during the night, and had returned to bed without noticing that the bracket had been broken.

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We Guarantee promptness with efficiency for Repairs.
JOSEPH TAYLOR (SATURATORS), LTD., Chemical Plant Engineers, Blackhorse Street Mills, BOLTON.
Telegrams—"SATURATORS, BOLTON." Telephone 848.

J. E. C. LORD (Manchester), Ltd., Ship Canal Tar Works, Weaste, Manchester. Pitch, Creosote, Benzols, Toluol, Naphtha, Pyridine, all kinds of Cresylic Acid, Carbolic Acid, Sulphate of Ammonia, &c.

SPENCER'S Patent Inclined HURDLE GRIDS.

THE very best Patent Grids for Holding Oxide Lightly.
See Illustrated Advertisement, May 25, p. 450.

CORRESPONDENCE TUITION in GAS ENGINEERING for City and Guilds Institute Exams. (Preliminary and Final). Successful Results. Low Fees.
PENNINGTONS ENGINEERING TUTORS, 254, Oxford Road MANCHESTER.

TAR WANTED.

BEFORE entering into any arrangement for the DISPOSAL of your Production it will be to your interest to communicate with
BROWNHILLS CHEMICAL WORKS CO.,
near WALSALL.

MEWBURN, ELLIS, & CO.,
CHARTERED PATENT AGENTS AND TRADE MARK AGENTS,
70 & 72, Chancery Lane, London, W.C. 2.
Telegrams: "Patent, London." Phone 243 Holborn,
And 3, St. Nicholas Buildings, Newcastle-on-Tyne.

NATIONAL ASSOCIATION OF TECHNICAL GAS OFFICIALS.

Head Office:—Temple Courts,
55, Temple Row,
BIRMINGHAM.

Full particulars for membership, &c., can be obtained from the General Secretary.

APPOINTMENTS, &c., WANTED.

CHEMIST, thoroughly Trained and Experienced in Modern Gas-Works Practice and Bye-Products Manufacture, seeks Position as WORKS CHEMIST or General Assistant.
Address for Full Particulars No. 7059, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

OWING to the Installation of Vertical Retorts and the subsequent Displacement of Men, we shall be pleased to RECOMMEND MEN having Experience as STOKERS, SULPHATE-MAKERS, BOILERMEN, on TAR DEHYDRATION PLANT, &c.
Inquiries to be addressed in the first place to the MANAGER, Gas-Works, TAUNTON.

APPOINTMENTS, &c., VACANT.

WHEN Filling Vacancies, please REMEMBER THE CLAIM OF THE EX-SERVICE MAN, who, other Qualifications being equal, has the FIRST CALL ON YOUR CONSIDERATION.

COUNTY BOROUGH OF BLACKBURN.
(GAS DEPARTMENT.)

ASSISTANT required to Take Charge of Vertical Retort Installation, also Tar Distillation Plant and other Works Tests and Analyses.
Candidates must have had good previous Experience.
Applications, stating Age, Qualifications, Salary required, with *copies* of three recent Testimonials, to be sent to the Undersigned, endorsed "Assistant," by Monday the 1st of August, 1921.
GEO. P. MITCHELL,
Engineer and General Manager.
Town Hall, Blackburn,
July 19, 1921.

WANTED—A Thoroughly Competent Man to Scurf and Patch Through-Retorts.
Apply, MANAGER, Gas-Works, WATFORD, enclosing *copies* of two recent testimonials.

GAS-METER Makers or Repairers wanted in Australia. Wages £5 6s. 6d. per week. Must be Thoroughly Competent.
Apply by letter, stating Age and Experience, to Box "L.S.," care of DAVIES & Co., 95, BISHOPSGATE, E.C. 2.

PLANT, &c., FOR SALE & WANTED.

GAS ENGINEERS AND MANAGERS.

LIST of Modern Gas Plant just issued. Copy willingly sent on application.
This comprises Retort Mountings, Condensers, Washers, Scrubbers, Purifiers, Gasholders, Exhausters, and Sundries. Complete Installations, Renewals, and Extensions.
It will pay you to ask us to quote.
FIRTH BLAKELEY, SONS, AND Co., LTD., CHURCH FENTON, *via* LEEDS

GAS PLANT FOR SALE—BARGAINS.

GASHOLDERS with New Steel Tanks, 172,000 c.ft., 115,000 c.ft., and several smaller down to 2000 c.ft. capacity.
PURIFIERS, Sets of 8 ft., 9 ft., 12 ft., and 16 ft. Square.
WASHER-SCRUBBER, about ¾ million cubic feet capacity per day, by Kirkham; one about 200,000 c.ft. per day by Holmes.
STATION METER, about 40,000 c.ft per hour, overhauled, and Several Smaller Sizes.
CONDENSERS, Set of Eight Annulars, outer tubes 36 in. diameter, by 25 ft. high, Inner Tubes Renewed, and 14 in. Diagonal Tubes. Equal to New. Two Sets of Four if desired. Other sizes on Stock.
FIRTH BLAKELEY, SONS, & Co., LTD., CHURCH FENTON, *via* LEEDS.

GASHOLDER and Steel Tank, 20,000 c.ft. capacity, Nearly New, Cheap for quick Sale.
FIRTH BLAKELEY, SONS, & Co., LTD., CHURCH FENTON

GAS Economizer (12979/21) for Cooking Stove Rings. Tested at Coventry Gas-Works. Splendid results. No Fixing required.
Sample and Particulars to Gas Managers throughout the country. 1s., post free.
J. DIAS, 5, MONKS ROAD, COVENTRY.

RAILWAY Tank Wagons for Disposal. Rectangular and Cylindrical, specially suitable for Oil, Inflammable Liquids, also Acids.
Inquiries invited.
BROTHERTON & Co., LTD., LEEDS.

THE BLYTH GAS COMPANY.

FOR SALE—
SULPHATE OF AMMONIA PLANT. Capacity one ton per day, by C. & W. Walker, Ltd.
EXHAUSTER. 20,000 C.Ft. per hour capacity, 10 in. Connections, by G. Waller and Sons.
10-IN. RETORT-HOUSE GOVERNOR, by W. & B. Cowan, Ltd.
FITTINGS FOR 5 BEDS RETORTS. 21 in. by 15 in., comprising Mouthpieces, Ascension Pipes, Hydraulic Main and Valves, 8 Retorts per bed. (Drakes Ltd.)
8 NEW RETORTS. Glenboig make, 21 in. by 15 in. by 10 ft.
The whole of the above are in Excellent Condition, the Machinery being in good Working Order.
Further details and information on application to the Undersigned, to whom offers should be addressed.
A. C. FAWCETT, Secretary, The Blyth Gas Company, BLYTH, NORTHUMBERLAND.

CONTRACTS OPEN.

WILMSLOW AND ALDERLEY EDGE GAS COMPANY.

THE Directors invite Tenders for the Surplus TAR and AMMONIACAL LIQUOR (Fixed and Sliding Scale) for Delivery during the Twelve Months ending July 31, 1922. Any further Information may be obtained from the Manager, Gas-Works, Wilmslow.
Tenders, to be endorsed "Tar and Liquor," to be Delivered to the Undersigned on or before Aug. 2, 1921.
W. H. WELSH,
Secretary.
52, Brown Street,
Manchester.

COMPANY NOTICES.

BOMBAY GAS COMPANY, LIMITED.

NOTICE is Hereby Given that the TRANSFER BOOKS of this Company WILL BE CLOSED on the 30th of July inst. until the 12th of August next, both days inclusive.
Warrants for the Final Dividend for the year ended 31st of December, 1920, will be forwarded by post on the 30th of August, 1921, to the Shareholders, or their Authorized Agents, registered at the date of closing.
By order of the Board,
A. DICKSON, JUNR.,
Secretary.
Moorgate Station Chambers, E.C. 2,
July 21, 1921.